MARINE REVIEW

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UNDER CONTROL OF THE ORE COMPANIES.

FULL SEVENTEEN MILLION TONS OF VESSEL CAPACITY ON THE GREAT LAKES FOR 1900 IS OWNED OR CHARTERED BY THE BIG STEEL CORPORATIONS.

JOHN D. ROCKEFELLER'S REPRESENTATIVES HAVE MORE THAN SIX MILLIONS OF IT.

A SERIOUS PROBLEM FOR SHIPPERS OF GRAIN AND OTHER COMMODITIES.

Lake vessels capable of moving 17,798,000 gross tons of ore in 1900 are already in the hands of the ore companies. These figures are amazing, and it may be that no such amount of ore can be produced from the Lake Superior region, but it is a fact nevertheless that the ore companies have this carrying capacity within their control, either through charter or through ownership of vessels. John D. Rockefeller's representatives have 6,300,000 tons of it. Whether all of this capacity will be used in the ore trade or not, is a question that can not be answered at this early day, but the situation is certainly one that should cause considerable anxiety among the shippers of grain and other commodities, coal included, as the ore companies have it within their power to cause the great bulk of this tonnage to go up the lakes light, if it is possible to mine and move on the railroads the unprecedented record in ore output that is looked for next year.

At no time in the past have vessels been tied up to season contracts as they are for 1900. This is due mainly to the struggle between the Rockefeller and Carnegie interests for control of the great bulk of the capacity. The rate of $1.25 a ton from the head of Lake Superior, brought on by this struggle, was what prompted the vessel owners to charter their ships. It was a tempting figure, as against the 50-cent rate at which some ore was carried little more than a year ago. While it is true that ships of the lakes are gradually drifting into the hands of big corporations, it is interesting to note that 6,423,000 tons of the total capacity thus engaged for ore comes from what are known as individual vessel owners. But this six and a half millions makes a great drain on the ships that are not controlled by the ore companies. It rounds up for some ore—in most cases nearly their full capacity—practically all the owners whose vessels are at all engaged in the ore trade. The few who are taking chances on "wild" rates could be counted almost on the fingers of one hand. This is the serious feature of the situation for the shippers of grain and other freight, who control no vessels.

In the following tables will be found the figures from which the foregoing conclusions are derived. The individual owners are put down for the estimates they have given to the ore companies as to the amounts they can carry. The fleets of the ore companies are put down for what they can move if they are to be kept in the ore trade. As already stated, it may happen that ore cannot be provided for all this capacity, and it may be necessary to shift some of it to grain and other lines, but this is immaterial from the standpoint of the summary, which is made to show what the ore companies have within their control. About the only fleets of importance not tied up in any way as yet to the ore trade are two or three in Milwaukee, and the vessels of the Eddy Bros. of Bay City, which latter, however, have some ore to carry from a mine which they own.

CONTRACTS OF INDIVIDUAL VESSEL OWNERS.

	Gross tons.		Gross tons.
Mitchell & Co.	800,000	Steamer Raleigh and consort Tokio	80,000
Wilson Transit Co.	600,000	Rust-Barnes	28,000
Corrigans, Jas. & John	450,000	Pickands-Clint	50,000
Gilchrist, J. C.	350,000	Stafford - Francomb - McWilliams	40,000
Minch fleet	140,000	Christy-Sonsmith	31,000
Bradley, M. A.	250,000	Forbes-McLachlan	50,000
Rhodes, R. R.	250,000	Two Parkers-Oades	75,000
Davidson, Jas.	325,000	Sparta-Havana	45,000
*Drake & Maytham fleet.	325,000	Britannic	50,000
Hawgoods, H. & W. A.	250,000	Golden Age-Edwards	60,000
*Tener fleet—Fairport	200,000	Newaygo-Anderson	35,000
Richardson, W. C., four boats	165,000	Geo. T. Hope	45,000
Whitney, D. C.	200,000	Tom Adams	30,000
McVittie, A.	275,000	John Owen	36,000
Marquette ore for steamers Presque Isle, Angeline, Roby and Ketchum, Cherokee and Chippewa	400,000	Simon Langell, two steamers	75,000
Hutchinson & Co., two steamers	100,000	Alcona-Alta	60,000
Becker, W. H. (Sauber).	65,000	Folsom-Mitchell	40,000
Mack, W. H.	50,000	Livingstone-Palmer	100,000
McBrier, Jas.	50,000	Aztec-Miztec	10,000
		Bielman	30,000
		Case	70,000
		Neosho-Helena	120,000
		Inter Ocean	18,000
			6,423,000

*Contracts not positive, but vessels will undoubtedly carry amounts of ore noted.

SEASON CAPACITY OF VESSELS OWNED OR CONTROLLED BY ORE COMPANIES.

	Gross tons.		Gross tons.
Rockefeller vessels—Bessemer fleet and whalebacks	4,250,000	Pickands, Mather & Co. Minnesota steamship and other vessels	2,000,000
Carnegie Co.—New boats	500,000	M. A. Hanna & Co.	1,000,000
Carnegie Co.—Lake Superior Co. fleet	500,000	Republic Iron Co.	240,000
Carnegie Co.—Lynn-Carrington	200,000	H. H. Brown & Co.—Castalia, Waldo, Northwestern Trans. Co. and Vulcan Trans. Co.	600,000
Carnegie Co.—C. A. Black	150,000	Cleveland-Cliffs Iron Co.	550,000
*American Steel & Wire, or Wolvin fleet	1,000,000	Steamers Wade and Devereaux	135,000
Corrigan, McKinnie & Co., seventeen small boats	250,000		11,375,000

*Best information available is that 700,000 of this is with Carnegie Company and 300,000 with Pickands, Mather & Co.

SUMMARY.

	Gross tons.
Capacity of vessels chartered from individual owners	6,423,000
Capacity of vessels controlled by ore companies	11,375,000
	17,798,000

Tonawanda Iron & Steel Co.'s fleet is not included in above calculations on account uncertainty as to capacity on Tonawanda draught.

LEGISLATION IN BEHALF OF OUR MERCHANT MARINE.

Questions Submitted by the Marine Review.

1. Shall the United States continue to allow its merchant marine in foreign trade to fight a losing battle until it entirely passes out of existence and foreign nations absorb the ocean carrying of our entire import and export trade?

2. Shall the United States decide, as its permanent nonpartisan public policy, that an equitable share of its imports and exports must be carried on vessels of the United States, built in our own ship yards and flying our own flag, and that congress will enact whatever national legislation may be needed to stimulate and encourage our citizens to create, maintain and operate the vessels this policy calls for?

3. If it is recommended that congress shall enact remedial legislation what shall it be, and why?

FROM ONE OF THE LEADING GRAIN CONCERNS OF CHICAGO.

Editor Marine Review:—I have been very much interested for some little time in the articles, correspondence, etc., which have appeared in the Review referring to our merchant marine. While I cannot add anything new to arguments that have already been used, I wish to add what I believe to be a fact, that every patriotic American citizen—and our citizens are all patriotic—must agree that this nation should see to it that a large percentage of its export and import business should be handled in ships of American registry; and it is certainly much more to be desired that foreign-built ships be admitted to American registry than to occupy so unimportant a place in the carrying trade of the world's commerce on the high seas.

I do not believe there is any doubt but what this nation is now experiencing, throughout its entire length and breadth, a period of prosperity such as we have not before experienced, and during such times it is well for the people to take action, and in a generous manner enable their government to adopt promptly, measures looking toward the accomplishment of the desired ends. HOMER H. PETERS.

Office of Bartlett, Frazier & Co., Chicago, Oct. 18, 1899.

FROM THE PACIFIC COAST.

Editor Marine Review:—For a long time prior to the war of the rebellion the American clipper ships were the pride of seafaring men and landsmen the world over. This period was during the period of wooden ships. They were symmetrical and the fastest ships afloat, and were manned by American seamen, all of whom were bright, active and admitted to be the best sailors then on the high seas.

During this period, as shown by the records, 95 per cent of the American foreign trade was conducted and carried in American ships, carrying the American flag and officered and manned by bright American seamen, and their earnings constituted that much of our national wealth; but when actual war overtook the nation, and the enemy's men-of-war, or rebel cruisers, made their appearance on the high seas and began destroying our merchant ships, their loyal owners saw that prudence required that they should protect themselves by at once selling their ships to nations at peace with the United States of America, and they did so, and the American merchant marine was obliterated, and we have made no effort since the war to replace it. While it left us without merchant ships, it furnished us with skillful officers and men with which to man our navy which was so much needed, and which we would not have secured readily had it not been for our large and well-manned merchant marine.

But, what is worse than all, congress has done absolutely nothing to encourage the rebuilding of our merchant marine. Its loss was, under the circumstances, inevitable, and the subsequent neglect to give aid and security to it has been criminal as well as selfish, and in consequence of such neglect this nation has beeen enriching foreign ship owners in the sum of $200,000,000 per annum, paid them by the people of the United States for carrying our American foreign trade and mails in foreign ships for a period of thirty years last past, a sum which would have enriched this nation in ten years (if paid to Americans) to the extent of $2,000,000,000, or nearly double the money now in circulation in the United States of America. Under wise legislation of congress the entire foreign carrying trade would have been transferred to American ships, carrying the American flag, and our ships would have been officered by bright, active Americans. This legislation would cause activity in every ship yard on both the Atlantic and Pacific coasts, and soon give employment and set at work in the various ship yards and in kindred industries 300,000 bright young Americans. It would open up many avenues of labor which are now unused. Capital would put money into American ships if it were assured that this nation would protect it for only a reasonable period. I feel assured that under a policy of protection the entire foreign carrying trade of this country could be transferred to American ships. It would not only provide the employment already referred to in ship yards, but would educate a vast army of competent men who would again support our American navy as they may be required for such service.

Under such a policy our manufactures would go out to every people on the face of the earth in American ships, and levy tribute upon them more successfully than could be done with artillery, as we could manufacture the goods, carry them in American ships, fix the price at home and abroad, and determine the charges for freight. This we are prevented from doing now as we must first negotiate with a foreign ship owner or his agent and allow him to take what may please him because we have no ships. When we have the ships we can do what England has so successfully done for 200 years. It is no wonder that London is the financial center of the world, when all the nations of the earth have been paying tribute to England and dumping it into London. Had this nation adhered to this policy since 1812 (the policy of Washington and Jefferson) New York city would have long since been the financial center of the world, not London.

The era of iron ship building began after this nation had lost its merchant marine, and England could and did build iron ships cheaper than any other nation could. But this nation can now compete with her and build iron ships as cheaply as they can be built in England or any other foreign country, and we can, and after our present rush at home is over, will sell steel to England with which to build her ships. Nevertheless American ships cannot as yet compete with foreign ships in the carrying trade on the high seas without some protection in the way of differential dues or bounties, because of the difference in seamen's wages, and cost of operation in competition with foreign ships.

It was the war of the rebellion that gave England the opportunity

WHY SECRETARY LONG, OF THE NAVY, FAVORS THE UPBUILDING OF OUR MERCHANT MARINE.

NAVY DEPARTMENT, JOHN D. LONG, Sec'y,
Washington, Oct. 20, 1899.

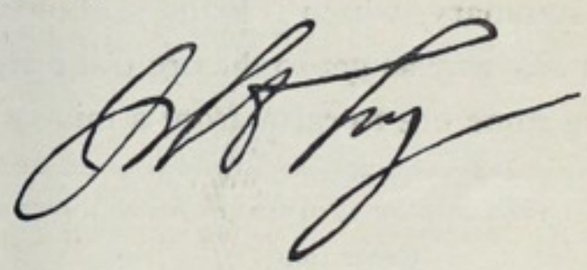
DEAR SIR—I have just returned from an absence of two weeks with the President in the west, and find many matters of importance awaiting my attention. I am therefore not able to write you at any length, but take great pleasure in saying that **I am heartily in favor of the upbuilding of the Merchant Marine.**

FIRST—By reason of the financial return which would follow from carrying our constantly increasing exports;

SECOND—From the increased business it would give our ship yards; and

THIRD—Because it would furnish a reserve of seamen upon which the Navy could draw in case of war.

Very truly yours,



TO THE EDITOR OF THE MARINE REVIEW,
CLEVELAND, OHIO.

which she embraced. When the war was over we found we had no ships but England had plenty of ships and ship yards and facilities for building more. With reconstruction on our hands and a period of great development before us, followed by such prosperity as no nation has ever had since the dawn of the human race, we were intoxicated with home affairs. Our congress became blind to its duties regarding the future. Its members became crazed about railroads, mines and real estate from the Mississippi to the Pacific ocean. We were soon without ships of any kind and we found our farmers paying tribute to foreign ship owners. When the Oregon, Washington and California farmer wishes to ship his wheat or other products of the farm to a foreign port he must of necessity move it in a foreign ship, and pay the freight or tribute demanded by the foreign owner. An American cannot even get a policy of insurance on the cargo or ship; it is all carried in an English company. The Englishmen are not blamable for this, but the American congress and their American constituents are.

There has not been an hour in the twenty-four of the last eighty years that an English ship has not arrived in England from a foreign port, laden with gold or silver or the products of the country visited, and from whom she has levied tribute, and deposited the wealth so obtained in England. Need we wonder that London is the financial center of the world? New York city should be, and would be under an American policy as outlined herein.

Let any American take a position on the steel bridge in the city of Portland, Ore., during the wheat shipping season and count twenty or twenty-five ships in port for wheat and flour, etc., and observe that all carry the English or a foreign flag, and not an American ship among them. If his blood does not course more rapidly or his indignation soar on a very high plane, he is sailing under a false name when he pretends to be an American desiring American supremacy, for he is not. The alleged crime of 1873 (even if true as charged) is a mere imaginary speck compared with the thirty years' crime (on our part) since the war of the rebellion. The failure and neglect of this nation for thirty years to protect its interests on the seas is a crime against this great nation, which cannot be measured in words and is not generally understood, but will be when the American people know that there can be no genuine reciprocity in trade until we have the ships to carry our own manufactured goods and possibly carry the goods of other nations received in exchange for our own, which means that we levy as much tribute as we please when the other party has no ship, and hence are at our mercy as to terms. The nation without ships is always in the power of the nations owning ships, so far as trade and commerce is concerned, "The weaker are always in the power of the stronger."

Our trade with Russia, China and Japan, from both the Atlantic and Pacific coasts is fast growing in importance, as is also our trade with the Central and South American republics, and with the rapid development now in progress in these countries continued for ten years to come there will be an immense trade direct from the Pacific coast with these countries, and we shall act very unwisely as a nation if we fail to appreciate it and provide American ships and other facilities with which to conduct and control it and share in its benefits, and also be on hand and prepared to conduct and control the trade of the Hawaiian and Philippine islands, Cuba and Porto Rico when the changed conditions now near at hand shall give the people of these places new courage, more business and better government,

The rebuilding of our American merchant marine, American ship yards, and the education of American seamen can be fully achieved, and the American foreign trade transferred to and secured to Americans, and the nation thereby enriched $200,000,000 annually, our manufactures strengthened, our commercial relations enlarged and reciprocity made easy with nations purchasing our manufactured goods and paying freights to our ship owners by the enactment of a proper law for the purpose.

San Francisco, Cal., October, 1899. J. E. LOMBARD,
Late Lieut., U. S. Navy.

THE PRESIDENT IS THINKING OF SHIPS.

It would seem from President McKinley's remarks at the Commercial Club banquet in Chicago, relative to the development of a powerful merchant marine that his next message to congress will contain some plain language on this score. The president emphasized most emphatically his remarks regarding the important relations existing between an American merchant marine and the industrial and commercial development of the country. In part he said:

"American shipping under the American flag should be seen in every port, and our trade must go wherever the flag goes. Our ship building has been greatly increased. For the first time in all our history the tonnage of our steam vessels exceeded on June 1 the tonnage of all our sailing vessels, barges and other craft. We built in 1897 and 1898 more vessels of steel than of all other materials combined. Our tonnage increased during the year 100,000 tons and is without a parallel in our recent history. More large ocean steamships are under construction in the United States than ever before. Our ship building plants are being enlarged and new establishments projected. There is no better time than the present, therefore, with all these favorable conditions, and others which will suggest themselves to you, for the development of a powerful merchant marine. Our relations to other nations, by reason of our new possessions, make this duty even more commanding than it has ever been."

Navy department officials have learned through a special inquiry what was long ago known to ship builders of the great lakes, viz., that there is a great scarcity of the excellent quality of white oak timber which has heretofore been found in abundance in Ohio. Experts in forestry claim that no material of equal quality can be found in any other state, and this would seem to be evidenced by the fact that every year from 1,000,000 to 1,500,000 feet of white oak timber is taken to Quebec and thence to Liverpool where it is bought by British ship builders.

AMERICAN SHIP BUILDING MACHINERY.

HEAVY PURCHASES MADE BY REPRESENTATIVES OF THE ITALIAN FIRM OF GIO. ANSALDO & CO. OF SAMPIERDARENA.

Heavy purchases of ship building machinery of American manufacture have been made by representatives of the Italian firm of Gio.Ansaldo & Co., who have just sailed for home after extended visits to the yards of the Cramp company, the Newport News Ship Building & Dry Dock Co. and the yards of the American Ship Building Co. at Cleveland and Chicago. The contracts placed with American manufacturers of machine tools aggregate fully $75,000. One of the engineers in speaking of the orders placed here said: "Our works at Sampierdarena, in the vicinity of Genoa, which now consist of ship building yards, mechanical shops, steel, malleable, cast iron and brass foundries, are about to be enlarged all round. A big shop will be constructed in Genoa for navy repair work. In view of these extensions, we came over here some three months ago and made an extensive inquiry into the systems of ship building and general mechanics now being pursued in America. It seems to me superfluous to make the remark that we have marvelled greatly at the improved methods and devices your various manufacturers make use of. I fail to see how any foreigner can be but impressed in the same way. The features of organization and division of labor prevailing in the big shops in the United States also struck us as unique. Everything seems to be carried out with clockwork precision.

"The number of young men who hold responsible positions also interested us. I need hardly say that it did not take us long to make up our minds to purchase labor-saving devices here. We bought one hundred machines, including lathes, planers, milling machines and various other machine tools, and when we get back to Italy I think I am safe in stating that further contracts will be placed in your country. As we may require to purchase some big machinery this year, one or both of us will return in a month or so. I may mention that our new shops will be built and conducted on American principles.

"While Newport News, Cramps' or the Cleveland ship building yards may not be quite on a par, in point of magnitude, with the Spezia yards, where the bulk of the Italian naval vessels are at present built, the American ship building yards are easily superior to them in organization and facilities for turning out work promptly. One of the things that impressed us most was that every possible ounce seems to be taken out of everything. The energy all round is nothing short of bewildering. I would not have believed it had I not seen it with my own eyes."

NAVAL TESTS OF WIRELESS TELEGRAPHY.

Inventor Marconi, with the co-operation of Rear Admiral Bradford, chief of the bureau of equipment, navy department, is engaged in completing arrangements for trials of wireless telegraphy with regard to its adaptability for naval use. The trials will take place during the month of November between the cruiser New York and the battleship Massachusetts. The electrical batteries, induction coil, sending key and receiving apparatus used by Signor Marconi in sending bulletins of the international yacht races will be installed on the New York. A duplicate outfit, which was used to receive the reports at the Highlands of Navesink, will be set up on the Massachusetts, while the set of apparatus which was utilized on the cable steamer will be erected on a third vessel or on land. Four naval officers especially detailed by Rear Admiral Bradford to watch the reporting of the yacht races will also be present during the naval tests. The officers are Lieut. Commander E. F. Qualtrough, Lieut. Commander John E. Newton, Lieut. George W. Denfield and Lieut. John B. Blish. These officers saw both the sending and receiving operations during the races and all expressed themselves as highly pleased with the workings of the system. When the two war vessels start to sea for their trials, each will be fitted with a tall pole, projecting at least 150 feet above the water. The trials will be made first at short distances and later will be extended until the full limit of the system's use is reached. Great circle sailings will be performed by the vessels and both day and night trials will be held as well as tests in heavy weather, during rain and fog and practically under every weather condition. Marconi claims that under favorable conditions he can transmit messages between vessels eighty miles apart and that weather conditions have no appreciable effect on the use of the invention. Fog and rain, it is claimed, might in some instances facilitate rather than retard quick transmission of communications. If the experiments between the two vessels are satisfactory, a land station may be established and tests made to determine the advisability of equipping light-houses so as to warn approaching vessels of danger. Signor Marconi expects to return to Europe within two or three weeks.

BRITISH SHIP BUILDING.

Returns compiled by Lloyd's Register of Shipping for the third quarter of the year show that on Oct. 1 there were under construction in the united kingdom a total of 558 merchant vessels of 1,347,549 gross tons. This is a considerable falling off from the showing on the corresponding date in 1898 when 598 vessels of 1,364,250 tons were building. Of the 558 vessels now under way but twenty-five are sail vessels. Of the total tonnage but two vessels, aggregating 3,350 tons, are building for the United States. It is notable that sixteen of the vessels are of 10,000 tons burden or above. There are under construction in the united kingdom eighty-two war vessels of 412,980 tons. Of this number fourteen vessels of 125,920 tons are building at the royal dock yards and sixty-eight vessels of 287,060 tons at private yards.

It is said that electricity will again be tried on the Erie canal. The Erie Canal Co. of New York, is said to have contracted for the construction of a number of electric motors, similar in type to automobiles. The scheme is to run the motors, which will require no rails, on the tow path. Each motor is to haul six canal boats at a speed of 5 miles per hour.

BUFFALO TUG OPPOSITION.

Officials of the Great Lakes Towing Co. do not seem to be at all disturbed over the announcement that the Maythams of Buffalo are about to establish an opposition tug line at that point. They seem of the opinion that although the boats are to be operated in the name of Capt. Charles Maytham, the opposition is supported by the same interests that sold out to the consolidation under an agreement not to again enter towing business for a stated period of years. Capt. Charles Maytham was not a stockholder in the old company, but it is claimed that there is nevertheless an indication of bad faith in the matter. At first thought it would seem that opposition might easily be developed in several parts of the lakes, but officials of the consolidation point to the fact that the tugs are not owned by a corporation that is simply in towing business, but by the vessel owners themselves. The stock is almost entirely held by corporations and individuals owning large numbers of vessels, and whose influence and connections extend to all branches of the lake business. This is the condition that causes the officials of the consolidation to feel thoroughly fortified in their position.

"We do not expect," said one of the officers of the big company, referring to the new Buffalo line, "to be free from occasional opposition from a tug or two at the different ports, but there can be no effective competition against our present position. Our own stockholders will not give their business to opposition tugs, and it would seem that other owners will not be disposed to antagonize us by patronizing a line in Buffalo that must give them poor service at the best. The talk of boycotting such vessels at other ports is nonsense, but it can not be expected that we will put ourselves out to favor the owner who gives us only such business as he is forced to give us. Aside from the line boats, the ships going to Buffalo are largely those of our stockholders. The line boats want, first of all, good service, and this they can only get from the fleet of Buffalo tugs owned by the Great Lakes Towing Co. It is one of the best fleets on the lakes."

NAVAL ESTIMATES FOR THE YEAR.

Estimates of appropriations needed for naval purposes, to be presented to the next congress, have been approved by Secretary Long. The estimates for the naval establishment for the fiscal year ending June 30, 1901, amount to $73,045,183.15; as compared with the appropriations for the current year of $48,507,995.58, showing an increase of $24,537,187.57. This increase includes for public works at all navy yards and stations, $12,268,-474.32; as compared with current appropriations for the same purpose, $5,840,786.50. It includes for the new naval academy, $2,021,000; as compared with the current appropriations, $720,000. It includes for increase of the navy, construction and machinery, armor and armament and equipment, $22,983,101; as compared with the current appropriations, $10,392,-402. The estimate for the bureau of construction and repair is increased by about $3,000,000. The estimate for the bureau of steam engineering is increased about $1,000,000. Estimates for pay of the navy are increased about $700,000. Estimates for ordnance are decreased about $700,000. The estimates include $1,498,300 for the Boston navy yard; $1,669,000 for the Brooklyn navy yard; $875,017 for the Washington navy yard; League island navy yard about $2,160,000; and almost an equal amount for the Norfolk navy yard. About $200,000 is asked for dredging at Dry Tortugas and $650,000 for the floating dry dock at Algiers.

CARNEGIE IMPROVEMENTS AT CONNEAUT.

The Carnegie Company has practically decided to make extensive improvements at the ore unloading docks at Conneaut during the coming winter. The most important work will be the construction of another slip, running north and south, parallel with the present slip and further east. This will be used for stocking purposes. In the beginning but one side of the slip will be utilized, although this alone will make an addition of fully 1,000 feet to the company's dock frontage. No contracts have yet been placed, either for the dredging or the unloading machinery to be installed. During the winter the Carnegie officials will also make further experiments with the Hulett automatic ore unloading machine, which has been erected on the Conneaut docks. In all probability several vessels loaded with ore will be tied up at the dock in the fall for this purpose.

It is estimated that with the five original Wolvin boats, as well as six now building, and the steamer W. H. Gilbert just purchased, the American Steel & Wire fleet will be capable of moving 2,000,000 tons of ore annually. These vessels are not owned by the American Steel & Wire Co. The company controlling them is made up mainly of officers of the American Steel & Wire Co., but the vessel corporation is entirely separate from the Steel company. The two new steamers of Welland canal size will be suited to moving the ore of this company to places where big vessels can not trade to advantage, such as the furnaces far up the river in Cleveland. This big fleet will this year be engaged largely in carrying ore for the Carnegie company and the Federal Steel Co. (they are said to be chartered for 1,000,000 tons), but it is expected that by another year mines of the American Steel & Wire Co. will be so developed as to require the vessels. It is said that the price paid by the Carnegie Steel Co. for the steamer Linn and barge Carrington was $475,000.

Simon Langell of St. Clair, Mich., will turn out on the opening of navigation next spring a wooden steamer of 2,700 tons capacity. This vessel has been in frame for a long time past, but was allowed to remain on the stock uncompleted, on account of the unsatisfactory condition of lake freights up to a few months ago. Work on her will now be hurried, as she is chartered to carry $1.25 ore next year. The burned hull of the steamer Aurora, being rebuilt by Alex Anderson of Marine City, is to be converted into a tow barge of about 3,000 tons capacity. This vessel is owned by Edward Carter of Erie.

Joseph Sellwood has been appointed general superintendent of the American Mining Co., an allied company of the American Steel & Wire Co., for the operation of Lake Superior iron mines.

TORPEDO BOAT DAHLGREN'S REMARKABLE SHOWING.

The United States torpedo boat Dahlgren, built by the Bath Iron Works, at a full-power sea run this week developed a speed of 31 knots. The Dahlgren thus exceeded her contract requirement by fully half a knot and also made a higher rate of speed over a mile course than has ever heretofore been attained by any torpedo craft of her size in the world. As the Dahlgren was to be tried on the standardizing screw method the tests began with a progressive trial on the day previous to that on which the run above mentioned was made. The first mile was made in 2 minutes 48 seconds, and after making a long, easy sweep without slackening speed, the vessel began her return trip south, which was made in 2:40. The mean speed of the first double run with and against the tide was therefore 22 knots. The mean number of revolutions of the screws was 238. The speed was increased, and with 264 revolutions a mean speed of 24.5 knots was obtained for the next double run. The vessel's change of trim was now particularly noticeable. Walking from the quarterdeck forward it seemed as if one were walking up a steep hill. Flames shot from the stacks and thick smoke was trailing astern. At 22 knots vibration was quite noticeable, but from this point as the speed increased the vibrations and disagreeable whipping and shaking seemed to decrease. The third double run resulted in a mean speed of 26¾ knots with 283 revolutions. The speed was now getting so great that it was dangerous to turn her at full speed. The vessel was therefore slowed down to make the turn, which is a bad thing for speed with quick-steaming water tube boilers. The fourth double run on the mile resulted, nevertheless, in a mean speed of 30 knots with 317 revolutions. A fifth run was about to be made at maximum power when it was discovered that the supply of feed water was such as to necessitate discontinuing the high speed tests.

NEW 600 FOOT CUNARD LINER.

The new Cunarder Ivernia, recently launched, will be notable in many ways aside from her size, which enables her to rank as the fourth largest steamer in the world. The Ivernia was ordered last autumn, was laid down in December, and unless something totally unforeseen should interfere will be placed in service between Boston and Liverpool next January. She is 600 feet in length over all, 580 feet between perpendiculars, 64½ feet beam, 41½ feet depth, molded, to upper deck, 49½ feet depth, molded, to shelter deck, 13,900 tons burden and 16¼ knots speed. The vessel has accommodations for 150 first-class passengers, 200 second-class and 1,000 third-class. There are four decks—lower main, upper and shelter decks, with an orlop deck forward of the boiler compartments and over all a bridge deck 280 feet long in the center part of the ship. In the lower portion of the ship, forward, are rooms insulated for carrying chilled beef, the cold air being supplied by three refrigerating engines fitted above. On the lower deck are cargo spaces, and on the main deck the third-class passengers will be accommodated. The second-class passengers are aft on the shelter deck, the top of which partly forms the bridge deck, on which, at the after end, is the dining saloon. Above the bridge deck in a large house will be accommodated the first-class passengers. Over this structure will be located a deck on which the ship's boats are carried and on which a promenade is afforded.

SHOALS IN LAKE MICHIGAN.

Referring to the Lansing shoal rock (Lake Michigan) on which the steamer Victory struck and which was found and buoyed later nearly a mile from where the Victory found it, Captain Perkins of the U. S. S. Michigan, says that he thinks the boulders are picked up by the ice in the winter and carried on shoals and in channels where they become dangers to navigation. As six-sevenths of any floating ice is below water and ice is frequently seen 3 feet above water in the spring, it follows that such ice if three feet above water is 18 feet below it and would readily scrape rocks along until they found lodgment in channels. Capt. Perkins' suggestion is that channels should be swept in the spring and such dangers noted at the opening of navigation, rather than later on after they have caused injury to navigation.

Captain D. H. Mallory of the steamer Pathfinder, reports to one of the branch hydrographic offices that having just passed Grays reef lightvessel, bound to Chicago, the Pathfinder, drawing 18½ feet of water, touched bottom in a position ½ to ¾ mile S S E. from Grays Reef light-vessel. There was no pounding, just a rubbing over a smooth surface. Afterwards, in the dry dock, could be seen where the ship had rubbed, 3 feet wide two-thirds of her length.

FLOATING DRY DOCK FOR HAVANA.

The Havana Dry Dock Co. of Havana, Cuba, has made arrangements for the construction of a new floating dry dock, which will in a measure replace the floating dry dock recently sold by the Spanish government to Vera Cruz parties. The new dock will be of steel frame, covered with wood and sheathed with copper. It is to be 360 feet in length and 90 feet wide, and will be capable of docking a vessel of 5,600 tons. The cost will be in the neighborhood of $750,000. A Pittsburg firm has been given a provisional contract for the steel construction. The specifications call for 1,500 tons of material, which it is estimated will cost fully $150,000. It is also practically settled that the dock machinery and equipment—engines, boilers, pumps, etc.—will be purchased in the United States.

Ship builders will be interested in advertisements from government officials on page 25 of this issue. The United States light-house board will open proposals Monday, Nov. 6, for the construction of a first-class, steel, steam light vessel, No. 73. Capt. C. A. F. Flagler, United States engineer at Montgomery, Ala., will open proposals Nov. 22 for the construction of a sea-going hydraulic dredge. The appropriation for the construction of the light vessel is said to be much too small considering the present high prices of ship building materials.

CANADA'S 14-FOOT WATERWAY TO THE SEABOARD.

The completion of the Soulanges canal, one of the principal works in the St. Lawrence system of Canadian waterways, which was formally opened on the 8th of the present month, would seem to indicate that Canada's long-talked-of 14-foot waterway, all the way through from the great lakes to the Atlantic seaboard, should certainly be in readiness for traffic about the opening of navigation next spring. This is the promise that is causing quite a few steel vessels of about 265 feet length and 2,700 tons capacity on 14 feet draught to be built on the lakes, and which will undoubtedly cause the purchase by Canadians of some vessels of this class from England. The following excerpt from the Toronto Mail and Empire describes the character of the work on the new canal, and the same description applies fairly to all of the St. Lawrence canals:

"The Soulanges is the connecting link between Lake St. Francis and Lake St. Louis, between which sheets of water the mighty St. Lawrence tumbles 82½ feet, and in a distance of about sixteen miles there are the Coteau, Cedars, Split Rock, and Cascades rapids. At extremely low water there is a depth of not more than 6 feet in the channel at some places, and it is to surmount these rapids that the Soulanges canal has been constructed. The canal is fourteen miles long, and leaves the foot of Lake St. Francis at MacDonald's point, just below the village of Coteau Landing. For one and a half miles it runs straight, touching the margin of the river about a mile from the upper entrance, and from the end of this tangent the line sweeps round to the northeast, behind the village of Coteau du Lac for about three miles. It is then continued by a second tangent, of some eight and a half miles long, passing about one mile inland from the Cedars village. Thence the line bends slightly to the north, and joins the Ottawa river about two miles from its confluence with the St. Lawrence at Cascades point. For all practical purposes of navigation the canal is a straight line throughout, and is two miles shorter than the route by the river. The fall of 82½ feet is overcome by four locks; 70½ feet of this is at the Cascades end, where the bluff forming the right bank of the Vaudreuil branch of the Ottawa gives an opportunity of locating three of the locks in the first mile, each having a rise of 23½ feet. There is an interval of over two miles between the third and fourth locks, the latter being about three miles from the lower entrance. Here the lift is variable; it is about 12½ feet at mean water of Lake St. Francis, but at extreme high periods it would, if this water were allowed to enter the canal, be about 15 feet. About 1,000 feet above lock No. 4 there are a pair of guard gates, placed for safety to the lower locks in case of accident. At the upper or Lake St. Francis entrance, there is a guard lock, by which the surface level of the summit can be regulated without interruption or danger to navigation. At periods of high water this will be used as a lift lock, but at ordinary stages of the lake its surface level will be that of the canal. The distribution of lockage is supplemented by a series of weirs, for the passage of the necessary supply.

"There are seven road bridges and one railway bridge across the canal, the latter of which traverses the lower wings of the guard lock, and carries the Canada Atlantic Ry. It swings over the lock and raceway, and is about 180 feet long.

"The canal throughout is about 100 feet wide at bottom, and was designed to have side slopes of two to one, but because of the slipping of the clay banks in some places the slope is now partially four to one. The banks are first formed to these slopes, and then a notch is cut to receive the stone protection lining. This is about 3 feet wide at the base, tapering up to about 1 foot on top, where it is finished by a rough coping. Between this coping and the top of the bank the surface is sodded, the sodding being returned about 5 feet on the level. On the north side of the canal a macadam road 15 feet in width will be formed throughout its entire length, the center of which is 33 feet from the edge of the cut or bank on that side.

"The site chosen for the power house, to generate electricity for the operating of the docks, bridges, etc., and the lighting of the canal throughout, is where the River a la Graisse crosses under the canal and joins the St. Lawrence about 400 feet to the south of it. The amount of electrical power required to operate the locks, bridges, and other structures, and to light the canal satisfactorily throughout its entire length of fourteen miles, was carefully determined by experts, who also worked out the details of the distribution and application of this power. The power house is connected with a regulating wire, which is intended to control the summit level of the canal without discharging a great volume of water through the Cascades locks.

"At the ordinary level of Lake St. Francis there will be 189 breadth feet of water in the canal, equal to a cross-sectional area of 2,524 square feet. Propellers of the type now being built on the upper lakes to navigate these canals will have a submerged midships section averaging 42 by 14 square feet, or less than one-quarter of that of the water area at mean level. This will permit of a fairly high rate of speed, as full depth under the keel of a vessel is of great value, both for speed and safety.

"The general features of lock twelve, which is typical of the others, are as follows: The lock is filled and emptied through culverts in the side walls, from which cast iron pipes 30 inches in diameter, ten on each side, lead into the bottom of the chamber. The pipes have 40 per cent greater discharging capacity than the culverts themselves. The lock will be filled in about five or six minutes, and this will be affected without subjecting the vessel to much surging or strain. At the head of each culvert there is placed in an 8 by 4-inch shaft, operated from the coping, a 6 by 6-foot sluice of the Stoney pattern. These are for the first time introduced into a Canadian canal. Their operation is very simple, and they have given the highest satisfaction in controlling large bodies of water in Europe, where they are in extensive use, being employed for that purpose on the Manchester ship-canal. The method of emptying and filling locks through tunnels in the side walls is considered to be very much the best, filling and emptying through valves in the gate, as in the Welland canal, having proven decidedly objectionable. Each lift lock is provided with a heavy breast wall at its upper end, corresponding in height to that of the lift. These walls have been reintroduced for the purpose of removing the cause of about nine-tenths of the accidents that have accrued on the enlarged canals, vessels carrying away the upper gates of the locks by striking them whilst entering from the lower reach. If a vessel goes ahead too far in a Soulanges canal lift lock it will strike against the breast wall and damage itself instead of the gates. The gates are built on what is called the "solid" plan, which consists of a number of superimposed timbers shaped to the required horizontal pattern and fastened together. The method is simple, and in this case the strength is superabundant. One leaf of the lower gates of the high-lift locks at the Cascades' end of the canal weighs over ninety tons in the air. The timber used is principally Douglas fir, which was hauled across the continent from British Columbia for the purpose.

"The lockages are expected to be made easily in from twelve to fifteen minutes. The capacity of the canal, at four lockages an hour, on the basis of one-third west-bound freight, would be about 20,000,000 tons in an ordinary season.

"Engineer Monro was transferred from the Welland canal at the close of 1888 and assigned the duty of determining the best location for a canal, having a navigable depth of 14 feet, between Lake St. Louis and Lake St. Francis. After extensive surveys and examinations he submitted a report in 1889 to the late Mr. John Page, chief engineer of canals, in which reasons were given why the new canal ought to be constructed on the north side of the St. Lawrence. Mr. Page died in 1890, and in June of that year a second report was addressed to the secretary of the department, confirming the views previously expressed. In that document the projected work was for the first time named the Soulanges canal. In a memorandum in January, 1891, prepared for Sir John Macdonald by Mr. T. Trudeau, deputy minister and chief engineer of canals, the scheme submitted by Mr. Monro was approved of in general terms. This view was subsequently confirmed by the government, and, in August, 1891, $300,000 was voted by Parliament towards the construction of the Soulanges canal, which was then estimated to cost $4,750,000. Plans and specifications were prepared, and in May, 1893, all the thirteen sections between Cascades point and Coteau Landing were under contract. Between the time of Mr. Monro's report of June 18, 1890, and the letting of the works, however, the bottom plan of the summit level, ten and a half miles long, and the foundations of the structures on it were lowered about 1½ feet, largely increasing the quantities, and adding about $500,000 to the cost of construction, making the total estimated cost $5,250,000, instead of $4,750,000."

CONTRACTS FOR NEW VESSELS.

The American Coke Co. of Pittsburg, operated by the American Steel & Wire Co., has awarded to the Elizabeth Marine Ways Co. a contract to build two towboats, duplicates of the Titan, which was recently built for Jones & Laughlins, Ltd., of Pittsburg. The vessels, which will be used for the transference of coal from the company's mines to Pittsburg, will be 135 feet in length, 24 feet beam and 4 feet depth of hold. Engines and boilers will be built by James Reese's Sons of Pittsburg. The cylinders will be 15 inches diameter by 6 feet stroke.

Keels were recently laid at Howard's ship yard, Jeffersonville, Ind., for two steamers for the Lee line. The Bayless Lee will be 191 feet in length, while the Rowena Lee will have a length of 175 feet. Both are designed for Tennessee river service. The Lee line is also making arrangements for the construction of a handsome steamer, to be known as the Stacker Lee, which will ply between Memphis and New Orleans and will, it is claimed, be the finest steamer on the inland rivers.

The New York Marine Power Co. of Paterson, N. J., has been incorporated. The incorporators are Charles H. Tucker and Frank L. Newell of Passaic, and Alfred E. Crow of New Rochelle. The company's office will be at 29 Lafayette Place, Passaic. The company, which is capitalized at $20,000, is organized for the purpose of building yachts and marine engines.

Carrier, Laine & Co. of Point Levis, Quebec, have nearing completion a handsome tug, the Robert Mackay, for the harbor commissioners of Montreal. The vessel, which will have a speed of 11 miles per hour, is 81 feet length over all, 71 feet length between perpendiculars, 17½ feet beam, 11 feet depth and 9½ feet draught. The boat is built of steel and cost $8,000.

Manager Frank Waterhouse of the Waterhouse Steamship Co. of Seattle, Wash., has announced that his company will this winter let contracts for two 2,000-ton steamers for the British-American line plying between Seattle and Honolulu. Each vessel will cost in the neighborhood of $100,000 and will have a speed of 10½ knots.

The Palmer ship yard at Noank, Conn., is busier than ever before. A total of 470 men are employed. One of the vessels on the stocks, the barge building for the Chappells of New London, Conn., will have a capacity of 3,400 tons of coal. Four barges are also under construction at the yard.

Work on the steamer Governor Dingley is being pushed at the Roach ship yard, Chester, Pa., and it is expected she will be completed within a few weeks. Some departments of the plant are being operated until 10 o'clock each evening.

William C. Abbott of Milford, Del., has contracted to construct for Jonathan May's Sons of Philadelphia, a four-masted schooner, 162 feet keel, 36 feet beam, 13 feet depth of hold and of 1,200 tons burden.

Alike to other manufacturers of machinery throughout the country the MacKinnon Mnfg. Co. of Bay City, Mich., is forced to work overtime in order to keep up with a great rush of work. This company received an order within the past few days from the Moran Bros. Co. of Seattle, Wash., for one of their standard ship yard jig mills. The Bay City company makes a specialty of jig mills of this kind and also of propeller wheels, aside from general foundry, machinery and boiler work. They have furnished propeller wheels lately for the tugs Lizzie, J. S. Blazier, River Queen, Kate, Strohn and Thos. Hood, and shipped yacht wheels to Washington, N. C., Jacksonville, Fla., Toledo, O., and Pekin, Ill.

THE NAVAL WARFARE OF THE FUTURE.

BY LAWRENCE IRWELL.

During the ironclad era we have had actions enough to supply material for a long and fairly satisfactory history of them, although the first-class vessel has often been absent from the engagements. The Yalu fight came as a revelation, and it knocked down the theories of many enthusiasts who insisted that the day of the ironclad was over. The Yalu affair rehabilitated the ironclad, and thrust the cruiser into the background. Beyond this it taught nothing. We know, without doubt, that the bigger the gun the less likely it is to hit the mark; but our knowledge of the subject only suggests that the best possible lies in a mean—a mean that is left to individual judgment. In 1896 the 12-inch gun embodied this mean; since then, however, the French have discarded it for a heavier weapon. We may expect other nations to follow suit.

The ram, tested by results, has proved itself more likely to be fatal by accident than by design. From an absolute belief in it, opinion gradually changed till it was spoken of as an impossible weapon; and the French, previously so partial to enormous spurs, so far discarded their old ideals as to build their battleship Brennus without any ram at all. Nevertheless, at the same time, our own government was busy constructing the Katahdin, a ram which is now in the navy. France has again begun to build ram-bowed ships, and the British second-class cruiser Arrogant and her sisters are short, double-ruddered ships, specially designed for use as rams. The whole truth about the ram is evidently not yet known.

The torpedo also forms debatable ground. With the torpedo-boat I shall deal later on; here I propose to speak of the torpedo-tube. The torpedo is a destructive weapon, but it cannot be used satisfactorily at a range much in excess of a quarter of a mile. At that distance the big gun can hardly miss, and its damage is quite as appalling as any that the less accurate torpedo could accomplish. Moreover, the slow speed of a torpedo—slow in comparison with a projectile—infinitely increases the danger of damaging a friend instead of the enemy aimed at. Further, every part of the ironclad not heavily armored being searched by quick-fire shell, the torpedoes are likely to be exploded in their tubes long before they can be utilized. So fully is this recognized that the under-water tube alone is being adopted for new designs, while the above-water tube is condemned entirely. Submerged tubes, however, are said to be difficult to use. In the American navy, as well as in the British, the deflection of the torpedo caused by the ship's movement has been reduced to a few degrees, but perfection has not been obtained. With other nations, the tube being of cruder design, the deflection is sufficiently great to make a hit at any considerable range almost a matter of pure chance.

SOME THINGS THAT WILL HAPPEN UNDER PRESENT CONDITIONS.

At present the gun holds the field as the weapon par excellence. It is fairly certain to hit the target at ranges under 1,000 yards and it will hit occasionally up to 4,000. Much beyond this latter distance the target offered by a ship is a spec so tiny that all the odds seem against a hit. A mile and a half is, perhaps, the greatest range at which any serious firing could be even attempted. Near or far, however, it needs no gift of prophecy to forsee some of the things that will be sure to happen under present-day conditions. Increased range will merely prolong the early stages of an action. Sooner or later all unarmored portions of the battleships will be blown to pieces; wreckage will gradually block the guns; shot-holes in the ventilators will reduce the speed and will make the engine-room an Inferno of heat. Two hundred degrees Fahrenheit may be looked for there, and it will have to be endured. The water-line is little likely to be hit, but rents just above it will be plentiful enough where there is no armor; and if there should be any sea on, the tons of water thus shipped will seriously affect a ship's speed, if they do not actually capsize her. The electric lights will cease to work; there will be nothing but oil lamps to penetrate the darkness. Fires may be expected at inconvenient moments. Many naval officers believe that no commander will be able to stand the above condition very long, and that by mutual consent the ships will steam into close range, anxious to finish the battle without further delay. What will happen in such a case, with the ships so close together that no gun can miss, so near that no armor can withstand the fearful impact, the imagination cannot really grasp. The devastation such an engagement must produce is too tremendous for a fanciful conception. It has one bright side—its endurance must be short. Some authorities think that upon one side or the other, panic will seize the crews, and that men will throw themselves overboard rather than endure the strain. It may be so. The question is simply how far discipline will hold.

To return to the long-range fight. Here, great as the apparent destruction may be, the actual damage will be comparatively slight. No captain will attempt to keep his men at the light, unprotected guns; these will be deserted, and damage done to them will not affect a vital part of the ship. The men behind armor will be safe, although they may be bruised; but the guns will not be silenced. The charges of modern shells are chiefly high explosives. These will be burst outside by even quite thin armor. In the few cases in which they enter and explode, the damage will be local. Hence we may look to see most of the ships comparatively sound, even after a long range conflict of considerable duration.

It takes a great deal to put an ironclad out of action. Even in the old three-decker days, when ships fought gun-muzzle to gun-muzzle; when if there were no shells there were splinters equally terrible; when the motive power was entirely exposed; when the gunners had no protection whatever—even then it was the exception, rather than the rule, for ships to be totally disabled. Nor were the losses in personnel very often sufficient to put a vessel out of action. At the battle of Cape St. Vincent, in 1797, which in its tactics closely resembled a modern ironclad fight, the British had only one battleship entirely disabled; and the defeated Spaniards lost but four. It is true that at the Yalu fight between China and Japan, which, in that the victors steered for a gap in the enemy's line, tactically bears some resemblance to St. Vincent, the Japanese had three ships disabled, while the Chinese lost five. This, taking into consideration the smaller number of combatants, is about double the proportion of a fight of a hundred years ago; but the above-mentioned battle was, in several respects an exceptional affair. Its early tactics—which led to the disablement of two Japanese ships—are not likely to be repeated. (The Japanese crossed the enemy's front and exposed their own rear ships in an attempt to cut off two small Chinese vessels.) No naval power of the first class would include in its fighting-line unarmored ships such as many of these combatants were. Only three ships which can properly be described as ironclads took part in the fight. Two of these were considerably "knocked around," but they did not suffer any vital injury; nor were many men lost on them; yet they were exposed to the fire of guns of over sixty tons for five hours.

REAL DANGER OF A MODERN SEA FIGHT.

The real danger of a modern sea fight at long range lies in the ammunition question. After such a battle, ships, perhaps still quite unsubdued, will be left with empty magazines. The biggest ironclad cannot carry enough for more than a few hours' vigorous cannonade, and it is now admitted that certain ships are overgunned. With a reduced armament, and consequently greater carrying capacity for ammunition, they would be more satisfactory ships. The problem of modern naval warfare, then, may be expressed in the following question: Will ships fight at long range, hurting each other but little, firing till all the ammunition is expended, or will they get to close quarters and mutually annihilate each other, meeting gun with gun, torpedo with torpedo, ram with ram? It is difficult to see how, in either case victory is to be obtained.

In a fleet action, the side which gets in most disorder appears to be usually the loser, but in a duel between battleships this element is absent. The exact amount of ammunition carried on a vessel in war time is a somewhat unknown quantity, but given two ships otherwise equal, we may assume that the larger carries most rounds per gun. Theoretically, A can fight at long range until the enemy, Z, has emptied his magazines, then steam in and win. But Z, knowing this, will endeavor to save ammunition—by no means an easy task. The speed of the two ships being about the same, neither—unless some chance shot makes it practicable—will be able to close with the other against the other's wish; and the desire for close action on the one side is almost sure to correspond to the reverse on the other. How is such an action to end? A lucky shot may end it. What else can, time alone will tell.

There are many theories about "beating down an enemy's fire." But fighting at a range at which quite 70 per cent of the projectiles miss altogether, how is this to be accomplished? The captains of the first two battleships that enter upon a duel under equal conditions will have a great problem to work out. If in a narrow sea, the fight may be not unlike a game of chess; but if there should be plenty of sea-room, then we have to face a game of checkers—not chess—upon an almost limitless board.

On the strategy of the next great naval war, it is not desirable to do much speculating. Captain Mahan has endeavored to read the future by the light of the past. But has he read the past correctly? Has not the fascination of history led him to overlook certain points of practical importance? Has strategy been the great influence in past campaigns? With great respect, I think not. It is easy to piece things together now, but in history, strategy so often seems to have been at the best only on very broad lines. A vague desire to get at the enemy, and beat him, without much thought of subsequent issues, seems rather to have been the dominant idea. The strategical advantages would seem to have been first noted and made use of after the victory; and the victory itself has so often been due to one side thinking that it had had enough before that idea occurred to the other. The truth is that the theories about carefully worked-out strategy have not been sufficiently proved to command complete confidence.

The war with Spain has taught us extremely little, because the Spanish navy was in deplorable condition—discipline could hardly be said to exist at all. In order to learn very much we must have a naval war between two first-class powers, and every humane man hopes that this event may be long delayed. The naval battle of tomorrow will be a terrible thing, but there is some reason to suppose that it will be far less dreadful than many of us are in the habit of imagining. Especially is there reason to think that it will not be very sanguinary. Science has made close-quarter fighting very much like annihilation, but it has only partially solved the problem how to hit at long range.

DYNAMITE GUN AND SUBMARINE BOAT.

"The day after tomorrow" must be considered. By that time the dynamite gun and the submarine boat may have been perfected. The former, however, is likely to be limited in its range and exposed to the fire of guns that can attack it long before it can reach them in reply; and the latter, even supposing the apparently hopeless problem of how to see under water to be solved, is hampered by innumerable other difficulties. It must come to the surface to see the enemy, and it can do so only in comparatively smooth water. For its own safety, it must move at a low speed, and a swifter enemy cannot have much cause to dread it under any conditions that as yet appear possible. It is dangerous of course, to attempt to prophecy, but the submarine boats of the future appear to have quite a limited value. At the same time it is only fair to say that so much secrecy is observed about these vessels that we never know accurately what the latest novelty has accomplished. The submarine boat means, in warfare, the probable death of the crew sooner or later, and it does not seem to promise any results worthy of the sacrifice. The future of special torpedo attack seems to lie with the boat swiftly moving along the surface. The first point to keep in mind is that it is impossible to tell how far away the enemy is. The actual firing of the torpedo is a comparatively simple matter; the principal part of the business is done in harbor beforehand; and the boat is steered so that the tube bears on the target. As soon as this is in line with the sights of the director, a trigger is pressed and the torpedo leaps out. But it is necessary to know the distance, and, as a matter of fact, this can only be roughly estimated.

The second and more important point is what are the chances of the torpedo being fired too soon. They are very considerable, for the upper-

most thought in the torpedo officer's mind is, "Suppose I am killed before my chance comes?"

A gun when laid, from the roll of the ship, may be on and off the target, but there is a far longer period during which it can be fired with a reasonable prospect of success than in the case of a torpedo. It can, too, be easily relaid. There is no such thing as relaying a torpedo-tube during an attack—no boat attacking a modern, well-armed ironclad is likely to live long enough for a second attempt—and the firer of the torpedo may be alone on the deck. If he be killed or disabled the chance of firing the torpedo is remote. At distances under 300 yards a torpedo is fairly certain to hit. At double that distance there must be a great deal of chance in the matter.

The usual time allowed to a torpedo boat under fire before she is considered out of action is from two to three minutes, but it is improbable that she will be destroyed in so short a time, although she may be disabled; and the longer the period taken to reach torpedoing distance may be regarded as a set-off against wildness in a ship's fire. All things considered, we may assume that the percentage of losses in peace manœuvres represents approximately the percentage of losses that may be looked for in war—one ship in fifteen or sixteen.

Of the torpedo boat destroyer little need be said. Swifter than the torpedo boat, she certainly is, but an extra four or five knots an hour is not sufficient to cause a revolution in warfare.

If the 12-pounder gun with its 3-inch shell were generally adopted, a great advantage might be conferred upon the big ship, but it must always be remembered that such ships have the disadvantage of slowness.

STEAM YACHT JOSEPHINE.

A TRIM CRUISING VESSEL THAT HAS ATTRACTED ESPECIAL ATTENTION, EVEN IN THIS DAY OF HANDSOME PLEASURE CRAFT.

In these days of splendidly constructed and superbly appointed steam yachts it goes without saying that a craft of this kind must possess exceptional merit in many directions in order to attract any unusual degree of attention. That the steam yacht Josephine has already enjoyed this distinction is an eloquent tribute to the skill of the Neafie & Levy Ship & Engine Building Co. of Philadelphia. There are few better ship builders in America than Mr. Sommers N. Smith, favorably known for his connection with the Newport News Ship Building & Dry Dock Co. The trim-lined vessel, just delivered to Mr. P. A. Widener, is further evidence of Mr. Smith's ability. Indeed, Mr. Widener's selection of the Philadelphia plant for the construction of his new yacht was in itself a testimonial, for he has had experience in the construction of other vessels and is possessed of rare judgment from a ship building as well as a ship owning standpoint.

The Josephine is a steel vessel and is classed as A1 under the British Lloyds. The general dimensions of hull are: Length over all 258 feet, on water line 216 feet, beam moulded 30 feet 3 inches, depth to main deck 18 feet 6 inches, depth to awning deck 26 feet 6 inches. The hull is built in excess of the full requirements of British Lloyds to class 100 A1, particular attention being given to strength and several special features being introduced to carry out that intention. A cast steel stem and stern frame are thoroughly secured to hull. The plating is flush above the water line, the steel plating being carried to awning deck, which gives high free board. The awning is carried forward to the stem, which is finished in a handsomely carved figurehead end. The awning deck extends from stem aft about three-fourths of the length of the vessel, the main deck extending the balance of the distance, which is enclosed by a high steel waist. The vessel is steered by hand and steam from bridge forward (Williamson's steering engine) with an auxiliary gear aft on main deck. There is a water bottom extending between collision bulkheads, with steel transverse bulkheads dividing the hull into numerous water-tight compartments.

On the awning deck is erected a steel house 68 feet by 11 feet. The outside of this house is paneled in teak, the steel work being fully covered. In the forward end of this house is the chart room, 10 feet by 14 feet, finished in antique oak, with a handsome chart table upholstered seats, and an elegant open stairway of oak leading to the hall below. Beautiful plate glass windows light this part of the vessel. Aft of chart room is the captain's room, finished in antique oak, with berth and desk. In the after end of the house is the library, finished in black walnut, with French walnut panels, beautifully carved. This room is fitted with bookcase, upholstered seats, fire place, etc., and lighted by plate glass windows and a skylight. In the after end of library is an open stairway, finished in black walnut, leading to the reception room.

On the main deck forward is the crews' wash room. Aft of this is the windlass for hoisting anchors, and next aft is the galley for crew and officers, fitted complete in every respect. Next comes the ward room or dining room for officers, waiters and cooks, with state rooms and bath for these men on the sides, finished in yellow pine, varnished.

Aft of the ward room are the owner's rooms—two of them—12 feet by 17 feet, and abreast of each other. They are finished in birch, beautifully paneled and carved. There is a drop of 30 inches in the awning deck at the forward end of the owner's rooms for the placing of a large air port that provides thorough ventilation and lighting of rooms. The rooms are furnished with desks, chiffoniers, wardrobes, drawers, bureaus and upholstered seats, all built specially; also handsome brass beadsteads. Off each of the owner's rooms is a bath room, thoroughly equipped and beautifully tiled. Aft of the owner's rooms is a hall, finished in oak, with open stairways leading to the chart room above and to guests' state rooms below. There is a vestibule leading from this hall to a gangway. Aft of this hall, on the port side abreast of the boiler enclosure, is the main galley and pantry, thoroughly equipped with every convenience, and beautifully tiled floor and sides. The galley is forward and the pantry aft, the pantry leading into the main dining room. On the starboard side, abreast of the boiler enclosure, are the captain's, doctor's, valet's and chief steward's state rooms, bath and toilet rooms, finished in oak, natural finish. The passageway between these rooms and the boiler enclosure, leading from the main dining room to the owner's rooms, is beautifully paneled in oak, Louis XV style. Aft of boiler enclosure is the main dining room extending from side to side of ship and 16 feet fore and aft. In the forward end of this room is an open fire place and bric-a-brac mantel elegantly carved. This room is beautifully paneled in oak in the style of Italian Renaissance. There are side-boards on either side, which are works of art, and massively carved extension table in the centre of the room. Two skylights on the sides of the house above this dining room, together with large side lights, make it light and airy.

Aft of the dining room and abreast of the engine enclosure on the starboard side, is the reception room, finished in black walnut, Louis XV style. The paneling and carving is surpassingly beautiful. This room is fitted with every comfort. There are double doors in the after end leading to a gangway and the open deck. On the port side, abreast of the engine enclosure, are the chief and assistant engineers' rooms and bath. Aft of engine enclosure, is the ladies' room, finished in cream white enamel on cherry, beautifully paneled and carved. In the after end of this room is the stairway leading to state rooms below. Aft of ladies' room, the deck is open, with awning.

On lower deck forward are the crews' and firemen's quarters and trunk room. Aft of these are four guests' staterooms, finished in birds-eye maple and aft of these rooms again on starboard side, is a bath room, tiled on sides and floor. In the center is a hall with open stairway leading to the main deck and finished in Louis XV oak. Aft of machinery, are the family staterooms, bath and dressing rooms. The bath rooms are tiled and the other rooms finished in mahogany and white and gold. In the forward hold is a capacious cold storage room, with numerous compartments for the various kinds of meats, game, fish, etc. There are large storerooms in the hold for provisions, etc. In the after hold is the storage battery system. Here also are the fresh water tanks and the sanitary tanks, the latter being controlled by a very efficient pumping system in the engine room. All bath rooms are supplied with hot and cold, salt and fresh water from pressure tanks, fed by large pumps in the engine room. The water system is automatic, the supply being ample and the pressure uniform. The plumbing throughout is of the most modern style and the different appliances are extra heavy plated. All that experience can suggest or luxury demand has been provided throughout the yacht.

The Josephine is schooner-rigged with two pole masts. Sails are hoisted by steam. On the awning deck is a two-pipe stanchion rail, with heavy teak rail on top. The vessel carries a steam launch, naphtha launch, two life boats, a gig and a dinghy. The flying bridge is fitted up in polished brass, and has modern electrical indicators, telegraphs, etc. Skylights and companionways are of teak throughout.

A feature of this yacht is the incandescent lighting for decoration, which includes a horizontal belt, a cable of lights from the water to the end of the bowsprit, and over both mastheads to the water again aft, and also a set piece between the masts displaying the name "Josephine." Altogether about 900 lights are used. The external finish of the yacht is white, with gilding fore and aft, and she presents a handsome appearance on the water.

The propelling machinery consists of one inverted direct-acting quadruple expansion engine, having cylinders 19½, 28, 39 and 57 inches diameter with a common stroke of 36 inches. The valve gear is the Walschaert radial type, the high pressure and first intermediate being fitted with piston valves and the second intermediate and low pressure with double-ported slide valves. The reciprocating parts of this engine are balanced, practically eliminating all vibration. The propeller and line shafting is of high grade steel, and the sectional wheel is of polished manganese bronze. Steam at 200 pounds is furnished by two cylindrical return-tubular boilers, 14 feet 9 inches diameter by 11 feet long, with four corrugated furnaces each. The boilers are fitted with an induced draught system, having two fans of 66 inches diameter which discharge into the stack. Cold air from the ventilators is drawn through heaters in the uptakes and from thence to the grates, regulated by valves in the fronts. There is an ash ejector in the fire-room discharging overboard above the water line. The condenser is independent, and is of steel with composition tube plates. The circulating pump is centrifugal, and the air pump is an independent Worthington. Two Westinghouse dynamos furnish the lights, and there is a Williamson evaporator and distiller for making fresh water. There is an Allen dense air ice machine for the cold storage room, and to supply ice.

KEY TO ENGINES AND ENGINE-RUNNING.

Small difficulty will be encountered in finding appreciative readers for the "Key to Engines and Engine-Running" just issued. The book is a practical treatise on the management of steam engines and boilers for the use of those who desire to pass an examination to take charge of an engine or boiler. It is replete with illustrations and instructions upon engineers' calculations, indicator diagrams, engine adjustments, and other valuable information necessary for engineers and firemen. The work is from the pen of Joshua Rose, M. E., author of "The Complete Practical Machinist," the "Slide Valve," "Modern Steam Engines," etc. In the preparation of the present volume it has been his aim to confine the contents to matters pertaining to the engine-room, and to so present each subject that the student could readily understand it without the aid of a teacher. The amount of space allotted to each subject and the method of treating it has been determined from a consideration not only of its importance, but also of the difficulty that many are apt to encounter by reason of their education having been limited. In all the parts teaching simple calculations especial pains have been taken to make each subject plain and clear, by the aid of engravings and explanatory notes placed alongside of the calculations.

The book is published by the D. Van Nostrand Co. Price $2.50.

The Greek merchant marine, although very small, is growing steadily. In 1883 it comprised only fifty-two steamers; in 1886 the number rose to seventy-two and now it is 159. Among the steamers added this year are three of over 4,000 tons register.

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It is announced that the trunk line railways have this season, for the first time in the history of the grain trade, taken more grain out of Chicago—bound east for the seaboard, of course—than the lake vessels. The gain for the railroads has been mainly in oats. The figures given to date are 75,240,468 bushels of grain for the vessels, as compared with 107,827,706 bushels by rail. For the same period in 1898 lake vessels were credited with 158,263,526 bushels, against 103,505,468 bushels by rail. Probably the figures are all right. If they are, they simply mean that the 3½-cent lake rate on corn from Chicago to Buffalo, which has prevailed for a long time past, has caused the business to go to the railroads. But this is not a matter of special significance as regards competition between the vessels and the railroads. Up to a few days ago there were not enough vessels to be had, even at the 3½-cent rate. The railroad harvest is due entirely to the demand for ships in other lines. When the Chicago-Buffalo rate returns, some time in the future, to a cent a bushel, modern ships of the 6,000-ton kind will carry the grain at that figure and make money on it, but this the railroads can not do.

Some interesting figures are contained in the report of the New York department of docks for the past year, which has just been made public. The total gross revenue of the department for the year amounted to $2,498,230.68, distributed as follows: From leased wharves and wharfage, $2,027,126.20; from ferry rents and franchises, $364,793.46, and from all other sources, $106,411.02. The expenditures during the same period were $3,452,890.47. Of this amount $1,936,105.36 was expended for the work of construction; $1,187,840.43 was paid for wharf property, and the sum of $249,588.56 spent in repairs, while the general expenses of the department amounted to $79,356.12. The net increase of new wharfage room made during the year was 11,998 linear feet by the city, and 200 linear feet built by the city at the cost and expense of private parties. The superficial area of the city's piers was increased by 632,000 square feet, and decreased by 71,000 square feet, making a net increase of 552,000 square feet. Six new piers were completed by the city on the North river, and two on the East river.

As showing how dependent ship owners in France are on the navigation bounty, the results of three voyages of ships about 2,520 tons burden each, and belonging to Nantes, have been published. On a voyage from Rouen to Swansea, San Francisco, Newcastle-on-Tyne, 357 days, the working expenses of one vessel, including depreciation at 10 per cent, were about $34,710, and the receipts about $27,610, or a loss on the voyage of $7,100; the bounty amounted to $17,890, so that the net profit was $10,795. The voyage of the second vessel was Barry Dock to a port in Spencer's Gulf, South Australia, and back to Swansea, 307 days, the expenses $22,285, depreciation $8,070, together $30,355, and the receipts $28,425, or a loss of $1,930. As the bounty amounted to $14,770, there was a net profit of $12,835. The voyage of the third vessel was Newcastle, Swansea, San Francisco, East London, Havre, 496 days. The expenses, including depreciation, were $47,950 and the receipts $47,525, or a loss of $425. The bounty amounted to $26,695, which left a profit of $26,270, or about 30 per cent on the capital.

A communication from Richard P. Joy of Detroit, in support of subsidies for merchant ships in the foreign trade, published in a recent issue of the Review, is criticized by the Detroit News. It is a fact, as stated in the News, that one of the difficulties this country has had to deal with in its effort to secure a share of the ocean trade has been the difference in rates of interest between capital in this country and abroad. This difference in rates of interest, however, has been rapidly lessened and may be expected to practically disappear with the increased wealth of the country. It is a well known fact that the capital invested in our internal transportation improvements does not, on the whole, pay an average rate of interest equal to the 2 or 3 per cent that the News states is too insignificant a sum for us to be bothered with. It will probably be news to the capitalists of the country, and especially those of the east, that opportunities are going to waste for investing their money in ways that will realize to them safely 6, 10 or 15 per cent and upward, as the News states.

During Admiral Dewey's stay in New York harbor a long distance telephone was fitted aboard the Olympia. Two copper sheathed cables were laid between the ship and the mainland at Tompkinsville, Staten island. The cable was laid after dark, with the searchlights of the fleet playing on the workmen. The cable was attached to the anchor chain of the Olympia, and sufficient slack was allowed to that the ship could swing with the tide. Naval officers claim that this is the first time in the history of the service that a warship has been in any way connected with the shore by submarine cable. In the harbor of Honolulu telephone connection between vessels and the shore may be had by anchoring the vessel both at bow and stern and connecting up with a permanent telephone cable. It will also be remembered that when the steamship St. Paul went ashore on the New Jersey coast a few years ago telephonic communication was maintained by an aerial line which was carried from the masthead of the ship to the shore.

FAVORING PURCHASE OF FOREIGN BOTTOMS.

INTERESTING ARGUMENT BEFORE THE UNITED STATES INDUSTRIAL COMMISSION BY MR. FRANK T. NEALL OF PHILADELPHIA—A SHORT REPLY.

Early in the present month, Mr. Frank J. Neall of Philadelphia, gave testimony before the United States Industrial Commission in Washington on the subject of our merchant marine. Mr. Neall favors the passage by congress of an act or acts granting to citizens of the United States the right to purchase foreign bottoms and put them under the protection of the United States flag with restrictions for the protection of our coasting trade. In support of argument presented on this score, Mr. Neall has just forwarded to the commission the following very interesting communication:

To the United States Industrial Commission, Washington, D. C.—Gentlemen: Complying with the promise which I made at the hearing before your commission Oct. 6, to substantiate with details the assertion then made by me, viz., that the merchant marine of the United States (steam and sail) of 1,000 tons gross register and upwards, and under twenty years old, flying the American flag, and suitable and available for transatlantic or transpacific trade, does not exceed a total of 300,000 gross tons register, I enclose herewith an itemized record, which I believe to include the rig, name, gross register, place and date of building and port of registry of every American steamer and sailing vessel comprised in the foregoing category. (This record is entirely too lengthy for publication but is in print and may be had from Mr. Neall).

Surprising as the figures given in my testimony may have appeared, they are indeed an understatement of vital facts intimately associated with the continued prosperity of the commercial interests of the United States. The value of the merchandise exported by the United States to foreign countries during the last calendar year (that is, ending Dec. 31, 1898), was in round numbers $1,200,000,000; the value of our imports of foreign merchandise during the same period was roundly stated, $600,000,000, making the sum total of exports and imports for twelve months upwards of $1,800,000,000, an aggregate movement of merchandise of the value of $150,000,000 per month.

The aggregate weight of the exports, as above, was about 30,000,000 tons (of 2,240 pounds) of which corn contributed say 5,000,000 tons; wheat, 4,000,000; lumber, timber, staves, etc., 3,000,000; oils, 3,000,000; coal, 2,300,000; cotton, 2,000,000, flour and meal, 1,700,000; provisions, beef, pork, lard, etc., 1,200,000; oil and cotton seed cake and meal, 700,000; iron and steel (pig and manufactured), etc., 700,000; fertilizers, 500,000. The imports for same period may be approximated in weight as 7,500,000 tons (of 2,240 pounds) of which may be noted, in part: Sugar, amounting to 1,600,000 tons; coal, 700,000; chemicals, drugs, dyes, etc., 600,000; hemp, jute, sisal and other vegetable fibres and manufactures thereof, 500,000; iron ore, iron, steel, etc., 400,000; coffee, cocoa, etc., 400,000; cement, 350,000; salt, 150,000; rice, 100,000; wool and manufactures of wool, etc., 100,000; wines, spirits, etc., 50,000.

In other words, the actual export and import ocean traffic out of and into the United States during the last calendar year aggregated a total of over 37,000,000 gross tons, dead weight; say over 3,000,000 tons per month. In this connection it may be noted that according to Lloyd's Register of Shipping the steam tonnage (gross) in vessels of 100 tons or over, of the world is 20,800,000 tons; sail tonnage (net) in vessels of 100 tons or over, of the world is 6,800,000 tons; total 27,600,000 tons. Of this total Great Britain owns, say one-half, 13,900,000 tons; the United States owns, say one-eleventh, 2,400,000 tons; Germany owns 2,400,000 tons, and Norway is next with 1,700,000 tons. But of the United States total of 2,400,000 tons, as shown by the enclosed statements, less than 300,000 tons could possibly participate in the movement of this enormous transoceanic traffic, which traffic actually, not theoretically, now exists, and must be carried by the vessels of some nation or nations, and the volume of which should naturally increase as the years go by.

The statements regarding vessels of the United States enclosed herewith show 140 steamships with aggregate gross register of 399,425 tons; 52 ships with aggregate gross register of 111,433 tons; 14 barks, with aggregate gross register of 18,870 tons; 88 schooners with aggregate gross register of 115,101 tons; or a total of 294 vessels of 644,829 gross tons register. From this total should be deducted, as not intended, and in reality unsuitable for the transoceanic trade, having been constructed especially for the requirements of coastwise or nearby commerce, 169 vessels of 348,644 tons gross register; leaving as suitable and available for transoceanic traffic 125 vessels of 296,185 tons gross register; of which are steam, 47 vessels, 149,040 tons; and of these latter 23 steamers with 73,420 tons were built abroad, and subsequently under various conditions, granted United States register.

In view of the foregoing facts, the question which was put to me by your committee "What laws, if any do you think ought to be enacted on the part of congress or the states in the interest of ocean transportation?" may, it seems to me, be answered as follows: In addition to such assistance as the United States government may see fit to extend to merchants, ship owners or ship builders in the shape of subsidies, bounties or postal considerations, in order to encourage the building of the higher class of merchant steamers suitable, if required, to be used by the United States government as auxiliary cruisers, transports, etc., etc., and to assist in maintaining the mail service with other countries, and without questioning the great value of the existence of such a fleet to the general government as well as to our maritime and commercial interests at large, let us with the greatest possible promptness, have enabling acts passed by the next congress granting to citizens of the United States

(a) The right to purchase foreign bottoms, steam and sail, and put them under the protection of the United States flag, with such restrictive conditions as will amply protect the existing coastwise merchant marine. These conditions should include the prohibition of the foreign-built craft from ever engaging in our coastwise trade, or in trade with any foreign port within, say, 500 miles of the shores of the United States proper, as existing on Jan. 1, 1898; and these foreign vessels, so acquired, should

each have a dead weight capacity of not less than, say, 5,000 tons, if steamers, or, say, 2,500 tons, if sailing vessels; further they should be not over five years old at time of purchase.

(b) Should this project for any reason not be practicable, then I would suggest the consideration by congress of legislation permitting our citizens to purchase and place under the United States flag the same kind of tonnage as mentioned above, and under the same character of rigid restrictions as to employment, but with the additional provisoes that such purchases of foreign-built tonnage must, as an experiment, not exceed a total of say 500,000 tons net register, and that on them must be paid, as duty to the United States government, the sum of $5 per net registered ton, say $1 per ton on date of admission to American registry, and $1 per ton annually thereafter until the entire $5 per ton shall have been paid.

What seems to be especially needed, if American owned vessels are to participate to any appreciable degree in transporting between our shores and those of foreign countries the great commerce that is continually passing across both the oceans that wash our coasts, is that our merchants should have the facility of flying our flag, not alone on high-class passenger and mail steamers, but also on the plain, economically-constructed, unpretentious freighters which are called "tramps"; for it is this latter class of vessel that travels with an average speed of 8 or 10 knots per hour, that transports by far the greater bulk of the world's ocean commerce. Some such legislation as has been indicated in general terms above, would, it seems to me, be a practical step towards the attainment of that end, at absolutely no cost to our government, and to the material profit of American citizens.

Neither would there be injustice wrought thereby to American ship yards, from which there is not today afloat a single ocean "tramp," and which ship yards, in all probability, could not within two years from this date build and place in commission a couple of dozen such steamers of 7,000 tons dead-weight capacity each; and in this connection, promptness, as well as practical action, is an essential factor.

In conclusion, I would mention as a pertinent illustration of the desirability—I might almost add necessity—for some such legislation as is suggested above, that for many years it has been customary for Norwegian merchants and ship owners, purely as a commercial transaction and without governmental aid, and without a home commerce in which to engage these vessels, to buy foreign-built freight steamers (and more recently to have them especially constructed for them in foreign ship yards), place them under the Norwegian flag and engage them in the transportation of merchandise in every part of the world. At the present time, for instance, there are no fewer than fifty-five such steamers averaging over 3,000 tons gross register each, flying the Norwegian flag, as shown by a statement submitted herewith. These are mostly under time charter, and in the majority of cases to merchants of the United States, making a fleet whose aggregate dead-weight carrying capacity is materially greater than that of the entire list of steamships now under the United States flag, suitable and available for trans-oceanic commerce. These Norwegian steamers are less than five years old, with the exception of twenty-one, which latter were built ten in 1891, three in 1892, four in 1893 and four in 1894. These steamers pay their Norwegian owners as a rule, from 15 to 25 per cent per annum profit on the investment, besides the profit which they may yield to the American or other sub-contractors, or time charterers. The equivalent of this fleet, which aggregates 169,900 tons gross register, could be built today in foreign ship yards for say $11,500,000, but the cost to the present owners was materially less than this.

If American ownership of modern foreign-built ocean freight steamers were promptly authorized by congress, I believe it would prove a safe, popular and remunerative additional source of investment for funds of American citizens, and would be widely availed of throughout the United States.

FRANK L. NEALL.

Philadelphia, Oct. 12, 1899.

NOTE.—In considering the relations of the terms net register tonnage, gross register tonnage and dead-weight capacity, as applied to the ordinary modern tramp steamer, a reasonably accurate practical rule is that 50 per cent. added to the tons net register will give the approximate tons gross register, and 50 per cent. added to the tons gross register will give the approximate tons of dead-weight capacity.

[Mr. Neall's statements to the industrial commission are given out as from the firm of Peter Wright and Sons, Philadelphia, whose large interests as ship brokers must be considered in connection with his conclusions. The communication bears the letter head of that firm. We are informed that he is an indefatigable worker and an able statistician. In a hurried reading of his communication, no attempt has been made to examine very carefully the statistical part of it, which may not be free from the human weakness of presenting statistics that, while entirely correct, are prepared, whether consciously or not, with a view to support some preconceived theory, rather than with a desire to cover an entire question, presenting every phase of it, and evolving a theory, broad and comprehensive, rather than narrow and one-sided. But whatever may be said of the accuracy of the statistics, the conclusions deduced from or founded upon them is another matter. It may be noted, for instance, that Mr. Atkinson is a good illustration of the statistician who may be able to collect facts but who is a child in deducing from them the lessons they should convey. Mr. Neall's paper is an interesting and valuable one. His conclusions are wrong.

1. "Promptness" is not an essential factor. On the contrary, it would endanger the success of all we are trying to do, if we had the power and should use it, to enormously expand our merchant marine immediately. We must recover our lost ground more rapidly than we lost it but on somewhat the same lines. We must plant so that we may keep what we get and have a chance to profit in a legitimate way from our enterprises. If we should immediately place upon the oceans 50 per cent more tonnage than there is a demand for, we would dishearten every one who attempted to operate it, and our last state would be worse than our first.

2. As a ship broker, Mr. Neall has keenly felt the want of ships during this season of abnormal demand. His business gains call for more ships. It is of little importance to him personally where they are built. There is nothing in his paper to indicate—and we venture to say he has no such idea—that he would put any of his own money into foreign-built ships, even if they were granted the American register he asks for them. From a knowledge of the opinions of those who operate ships upon the oceans, it is safe to say they would all unite in pronouncing Mr. Neall's plan utterly impracticable, unless he means that our citizens shall buy British ships, give them American registry and then subsidize them as we must do ships built in our own yards and operated under our flag.

3. The statement that facts are sometimes used to support a false theory is fairly illustrated by the reference Mr. Neall makes to Norwegian vessels. There is no possible comparison to be advantageously made between Norway and the United States in determining our commercial policy. The one nation is small, unimportant and feeble. The other is great, important and commanding in the family of nations. Norway may have to depend upon other nations for her war and other ships, and it is a matter of small importance to her, for no matter where she gets her ships she is at any time at the mercy of any first-class naval power. It is needless to say this is not or will not be so with the United States. Norway is a seafaring nation with a large share of its people dependent on the sea and willing to accept for its service wages that our people would not look at.

4. It may be our ship yards, discouraged as they have been in the past, have capacity for building few merchant "tramp" steamers compared with the British yards, but give them the encouragement of a liberally-subsidized merchant marine to work for, and it will not be very long before the opportunity will be past for any American to speak as Mr. Neall no doubt regretfully does of our mortifying lack of ship building industries upon our ocean coasts.—Editor.]

LABOR UNION YOKE IN BRITISH SHIP YARDS.

The weekly pay system recently adopted in the ship yards of the Clyde, and which it was hoped would in a measure solve the difficulties that have for some time past borne heavily on British ship building interests, seems to have proven an utter failure. Referring to the experience of the ship builders thus far in this matter, the Engineer of London says editorially in a recent issue:

"The weekly pay system on the Clyde, and in other Scottish building districts, after about four and a half months' trial, cannot be said to have benefitted the men who agitated for it; and it has certainly proved, so far, to be even a greater source of loss and annoyance to the employers than even the most pessimistic of them anticipated. Men who previously lost one and often two days' work after their fortnightly 'burst' are now found, as a rule, to be losing the same amount of valuable working time after each weekly pay. Employers and managers, with the glut of work on hand, feel very sore over their experiences, but, of course, the trial was to be for a year, and possibly matters may improve before the expiration of that period. One firm, the Grangemouth Dockyard Co., has already felt so aggrieved at the flagrant squandering of working time that it, some little time ago, issued the following notice: 'After this week we intend to return to fortnightly pays, owing to the adverse circumstances resulting from the introduction of weekly pays, both to men and employers. We are sure that the men will be of the same opinion as ourselves—that the weekly pays have been no benefit. Quite a number of workmen have expressed themselves that the loss of time since the introduction of weekly pays has been so great that they are willing to revert to the old system.' Following upon the issue of this notice a men's meeting was called to protest against the proposed change, and the manager, who was present, agreed to abide by the vote of the majority of those present. All present declared themselves in favor of weekly pay. The Grangemouth Dockyard Co. will, therefore, probably have to bear its yoke like others; but its action, all the same, may have done something towards bringing its own and other workmen to see the insane folly of making a curse of what was intended to be, at least, a benefit. But there is only too good reason to believe that it is not alone on the part of the chronically unsteady and dissipated among the men that working time is needlessly lost. On this and kindred points some significant references were made by the chairman of the Palmer Ship Building & Iron Co., in the course of his speech at the annual business meeting of that company recently. He is reported to have said that, having looked into the figures, the directors found that in the ship yard the men were actually losing on an average 28 per cent of the time they might work. They were, however, not so badly off in this respect as other firms, there being cases in which as much as 40 per cent was wasted. The Clyde seemed much in the same position as the Tyne, as he had been told that 30 per cent, on the average, was being lost there. It was a very serious state of things for this country that working men—many of them of the highest skill and intelligence—should be so reckless with their resources. Platers could earn 25 shillings a day by piecework, riveters could earn 15 shillings a day, and some other classes of workmen about a pound a day. Yet such men deliberately wasted 40 shillings a week and more by declining to earn more than a certain fixed income."

In addition to the four steamers building by Harland & Wolff of Belfast, Ireland, for the Atlantic Transport Co., the company has purchased a vessel on the stocks at the same yard and originally intended for the Hamburg-American line. This latter vessel, which will be ready for delivery next months, is a sister craft of the Brasilia, which was described and illustrated in the columns of the Review some months ago. Her carrying capacity will be in the neighborhood of 12,000 tons.

Unusual activity still prevails in all parts of the works of the Pusey & Jones Co., Wilmington, Del. This company has just completed the entire reconstruction and refitting of the steamer Hildegarde, running between Smyrna, Del., and Philadelphia, and is making extensive repairs to the United States light-house tender Wistaria. A new brick and steel pattern shop is ready for roofing. The steamer building for river service in South America is framed, ready for plating.

WATER TUBE BOILERS FOR MERCHANT VESSELS.

A short time ago an investigation of water tube boilers in general, but Belleville boilers in particular, was started by the Pall Mall Gazette of London, and in order to answer intelligently a number of questions from correspondents, the London Times sent a representative aboard the steamer Tasso, owned by Messrs. Thos. Wilson & Sons, well known ship owners of Hull. The workings of the boilers of this steamer were reported in the Times and attracted a great deal of attention and widespread discussion. The Syren and Shipping of London, sums up the whole matter in the following article:

"Mr, C. H. Wilson, senior partner of the well-know firm of Messrs. Thos. Wilson & Sons of Hull, is a man who has the courage of his convictions. It will be remembered that when the question of water tube boilers for British war vessels stirred the pulses of the House of Commons, he was ever an able advocate for the new type. His conviction of the greater utilities of water tube boilers is not derived from any mere sentimental or theoretical opinion. The water tube boilers which he has consistently advocated for war vessels he has not hesitated to put into some of his own ships. In all Messrs. Wilson have eight vessels fitted with water tube boilers. Had they been put into the ships when built the value of the experiment would have been considerably modified. As it is, however, all these boats were originally provided with the return tube boilers in ordinary use, so that exact data for comparison between the two types of boilers is available. The first of the Wilson fleet was fitted with water tube boilers in the year 1893, and the success attendant upon the experiment justified the owners in extending the system to two other vessels in 1895, a fourth in 1897, three more during 1898, and an eighth during the present year. This last vessel is the Tasso, which was built in 1890. She is a screw steamer, 252 feet by 32 feet by 16½ feet, and of 1,328 tons gross, and was fitted with the ordinary cylindrical boilers of the return tube pattern. These, however, have been superceded by the Babcock & Wilcox water tube boilers. The reason for the alteration is significant. Messrs. Wilson are no philanthropic ship owners. Nor were they seeking so much to effect an economy as to do away with the unsatisfactory and troublesome working of the boilers which were at first in the ship. The Tasso, with her new boilers, commenced running from Hull to Drontheim in June last, and her first six summer voyages are compared with corresponding trips when she had ordinary boilers. On the last-named voyages, the total distance steamed was 9,472 knots, the coal consumption 1,072 tons, and the mean speed per hour 11.45 knots. Fitted with water tube boilers, she steamed 9,200 knots, with a total coal consumption of 981 tons, and a mean speed of 12.05 knots. Thus a saving of 90 tons of coal was effected, and that with an increased speed of 0.6 knots per hour. Of course it is a fair presumption that had the engines been driven to secure just the same speed as was obtained with the old type boilers, the coal saving would have been increased by 30 to 40 per cent. It is urged against the water tube boilers that they require constant repairs, tubes having to be frequently replaced, etc. The same objection can, of course, be urged with almost equal force against the older boilers, and the fact that the latter contrast favorably in the matter of longevity with the water tubes, is discounted by the fact that they need very regular repairs and frequent renewal of parts.

"On the question of initial cost, it is difficult to form an estimate, but it is certain that Messrs. Wilson would not have gone in for reboilering were they not confident that they would be the gainers thereby. Originally the boilers of the Tasso provided steam at 160 pounds pressure to the square inch, while the new boilers work at 210. The tubes are 1⅞ inch diameter. A purifier and a feed-heater, which raises the temperature of the water to 200 degrees, are also part of the equipment, while there is also an evaporator to make good the fresh water lost by leakage, evaporation and use of steam whistle, etc. Soot was cleared off the tubes every six hours by means of a steam jet, and fires were cleaned every twelve hours. The boilers were easy to stoke. Messrs. Wilson's engineering staff maintain that the quantity of smoke (unconsumed fuel) which escaped from the funnel was very materially reduced. To the ordinary lay mind the principal and only advantage attaching to water tube boilers is the rapidity with which steam can be raised, and hence their ideal suitability for war vessels. Of course such facility in getting up steam is by no means a disadvantage to merchant ships. The Tasso, starting from all cold, lighted fires and had 50 pounds pressure of steam in 10 minutes, a rate of heating which would have ruined an ordinary Scotch boiler. But granting the advantages of the water tube boiler from the quicker-steam-raising and less-coal-consumption point of view, practical men will maintain that the real crux of the matter is the initial cost and longevity of the new boiler as contrasted with the type of boiler generally used in the merchant service. The argument that the new boiler is a more delicate and complex structure than the other, and requires greater care in manipulation, we may dismiss from the controversy, for marine engineers are experts who would soon adapt themselves to the change. The relative cost is the thing, and on this point it will go far to win ship owners to water tube boilers that a level-headed firm like the Wilsons find, after a pretty exhaustive trial, that they have no reason to regret their experiment."

A number of our Canadian exchanges have gone into hysterics because of the order issued by the Ottawa council permitting American vessels to engage in the grain trade between two Canadian ports—Fort William at the head of Lake Superior and Depot Harbor on Parry Sound. Canadian owners are protesting strenuously that the seriousness of the grain blockade at Fort William has been overestimated, and they assert that this new order is, as one of them expresses it, "putting the lid on our coffins."

Ship building progress in Japan continues to attract attention. The Nagasaki ship builders announce that they expect to complete the 6,000-ton vessel now under construction in thirteen months from the time of laying the keel.

KENTUCKY AND KEARSARGE TRIALS.

Announcement is made that the builder's trial of the battleship Kentucky, sister vessel of the Kearsarge, recently completed by the Newport News Ship Building & Dry Dock Co., will take place within ten days or two weeks. The Kentucky has her main battery of 13 and 8-inch guns almost complete. Before proceeding on her trial the battleship will be painted white.

In connection with the announcement of the trial of the Kentucky it is interesting to note the showing made by the official report of the trial of the Kearsarge, which has just been made public by the navy department. It shows that the true mean speed of the Kearsarge on the trip was 16.816 knots. The run consumed 3 hours, 55 minutes and 14 1-5 seconds. The actual length of the course was 66 nautical miles and it is shown by the report that after allowing for tidal corrections the Kearsarge ran 65.929 knots. The mean draught of the Kearsarge was 23 feet 6 inches, and she displaced 11,550 tons of water. Owing to the unfinished condition of the superimposed or two-storied turrets of the vessel, the board was not able to test their workings; but it managed to have the forward turret temporarily put in working order and turned slowly through 180 degrees. The helm was put hard to starboard, 35 degrees, in 8½ seconds and then turned from hard-a-starboard to hard-a-port, 70 degrees, in 19 seconds. Under the extreme helm the heel of the ship was from 4 to 5 degrees. On the first trial run the average steam pressure was 180.2 pounds, the average revolutions of the starboard engines 116.5, and of the port engines 117. The average steam pressure at the boilers on the return run was 116.4 pounds and the average revolutions for each engine 111. On account of a leak in the feed water heater and leaks in some boilers there was a loss of pressure and a consequent loss of speed. The board was very much pleased with the steering and maneuvering qualities of the Kearsarge, which were found to be excellent. She was practically free from structural vibrations. It is recommended by the board that the Kearsarge be accepted after some work has been done, and Acting Secretary Allen has referred the report to the chiefs of the bureaus of construction and steam engineering, with directions to have this work completed as soon as possible.

TO COMMAND IRON AND STEEL MARKETS.

President W. L. Brown of the American Ship Building Co., known as an exceptionally keen observer of industrial conditions, has just returned from a two months' European trip. Commenting on the outlook, he is quoted as saying:

"I have returned to the United States even more strongly impressed than ever before that we can and will be able to command practically the markets of the world with our iron and steel products. I was also convinced that with the world's demand there is certainly a growing scarcity of raw material both in Great Britain and at the better known points on the continent. In Great Britain I found every iron and steel industry, as well as ship building, very active, quite as much so as at home, and necessarily to a large degree this extends to the continent, although I did not see so much of this on the continent as in Great Britain. The English give many reasons for feeling that we are going to build up an American marine. They recognize the fact of our ability to produce raw material for the purpose, our very large and increasing export business at prices that fully compete with their home manufactures, and, underneath it all, it seemed to me, a very strong paternal feeling that it was within the power and province of the two nations to largely act as a unit in the increase of our marine. They recognize the fact that it would be impossible for them to create and hold it all, and that with the close relations existing the mutual sequence would be our progress in that direction."

NOT MONEY ENOUGH.

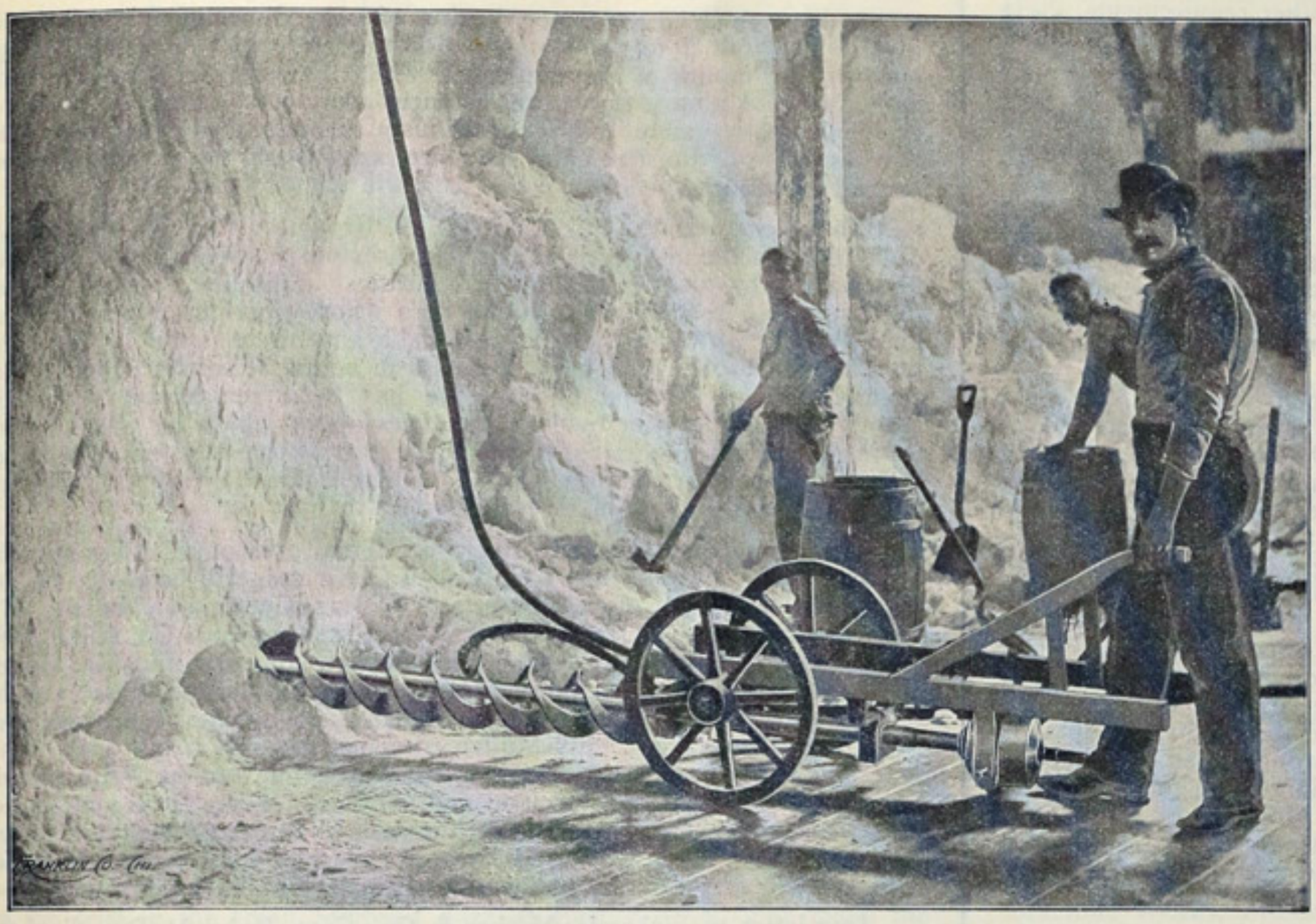
All the ship building firms in the country who have had experience in government work are of the opinion that there is not a sufficient sum of money appropriated for the construction of the new cruisers of the Denver class. A sheathed vessel is a very expensive vessel to build, and the specifications of the new vessels are much more rigid, and they also call for much more expensive materials than has been the usual naval practice up to date. Steel is now quoted three and one-half to four times as much as it was when the contracts were awarded for the Arkansas class of monitors. Copper, brass and bronze which are specified freely in the specifications of the new cruisers, has advanced 50 per cent. All material entering into the construction of a modern war ship has greatly advanced in price quite recently, and definite delivery cannot be guaranteed even at the present abnormal prices. Good quality lumber to pass United States inspection is very difficult to get, and the electric fire proofing process is very expensive. It will be remembered that since the bill authorizing the construction of these vessels was passed, the displacement has been increased about 60 per cent. It is quite probable that no bids worthy of serious consideration will be received at Washington Nov. 1, for the construction of the six cruisers of the Denver class. The prevailing opinion among ship builders is that the appropriation should be at least 30 per cent more than it is.

An end of the legal complications growing out of the collision between the British ship Cromartyshire and the French liner La Bourgogne has finally been reached in the award by the English register and merchants' court of $35,000 damages, exclusive of expenses to the owners of the Cromartyshire. The sum includes $3,000 to the owners of the steamer Grecian for salvage services and $5,000 demurrage for detention of the Cromartyshire during repairs at Halifax.

Flint & Co. and Dearborn & Co., two of the most prominent shipping firms of New York City, have combined under the firm name of Flint, Dearborn & Co. The new company, which has been incorporated under the laws of New Jersey, will eventually operate a steamship line between New York and San Francisco. Four steamers, it will be remembered, are already building for this service.

A NOVEL COMPRESSED AIR TOOL.

The illustration accompanying this article shows a novel application of compressed air tools, as adapted to the salt block of the Buckley & Douglas Lumber Co. at Manistee, Mich. The salt is dumped in vast storage rooms below the grainers or vacuum pans, from 16 to 20 feet



deep. When the salt was packed it was found necessary in the past to use picks, grub hoes, etc., to quarry and break up the salt, so as to admit of its transfer to barrels. The vacuum pan salt being of very fine grain and containing a large percentage of brine becomes very hard and compact, so that it is very difficult to break it up for packing. During the past season labor was scarce, and the Manistee concern found they could not get men to break up the salt ready for packing. In this emergency, the arrangement shown was brought into play. As will be noted, a truck was made with a horizontal shaft, to which was attached a 10-inch spiral auger, 6 feet long, and operated by a No. 2 Boyer piston air drill, furnished by the Chicago Pneumatic Tool Co. The operator advanced the truck to the base of the salt wall, and the auger would penetrate a depth of 6 feet in 45 seconds. The holes were drilled as closely together as possible, and in from one to three hours the section thus undermined would fall and break up all ready for packing, so that it was then only necessary to shovel it into barrels and head them up. By the use of this machine two and one-half days in a week, it was found that thirty packers would do the work that previously required sixty packers, and the most laborious part of the work having been removed, no further difficulty was encountered in securing men to pack the salt. This is only one of the many new uses to which compressed air tools have been applied of late. It is sufficiently novel to interest readers of the Review.

NICLAUSSE BOILERS OF 60,000 HORSE POWER.

The Stirling Co., Pullman building, Chicago, manufacturers of the well-known Niclausse water tube boiler, which is in use in the navies of all the leading maritime countries of the world, now has under construction at its works boilers of 60,000 horse power for the following war vessels: U. S. monitor Connecticut, building at the ship yard of the Bath Iron Works, Bath, Me.; U. S. battleship Maine, Russian battleship Retvizan and Russian cruiser Variag, building at the works of the Wm. Cramp & Sons Co., Philadelphia.

Senator M. A. Hanna, one of the authors of the Hanna-Payne bill, in a speech delivered at Cleveland some days ago and devoted largely to advocacy of the shipping measure, said: "The large industrial organizations have lessened the handicap against American products by establishing branches in European countries, and reducing the cost of manufacture. The time is now ripe for the government to wipe out the handicap by encouraging the building of American steamship lines to take care of all American products. The subsidy provided by this bill is limited to $9,000,000 a year. Every year American producers have been putting over $200,000,000 into the pockets of foreign steamship owners. We have been the producers, but they have been the distributers. The subsidy the government would pay would not cover more than a fraction of the fuel bills of the American ships which would be built if this bill were passed."

The tug John Nichols, the newest product of the well known ship yard of Peter Magee at Athens, N. Y., has proven all that her owners or builders anticipated. The new boat, which was built for the New York Harbor Towboat Co. and C. E. Evarts & Co., and will be used in general work in New York harbor, is 98 feet in length, 22½ beam and 10 feet depth of hold. Engine and boiler, the former of the steeple-compound type, were furnished by John W. Sullivan of South street, New York.

The Spanish government has sold to parties at Vera Cruz the Havana floating dry dock which the United States navy department made several efforts to secure. It is stated that the price paid was in the neighborhood of $600,000.

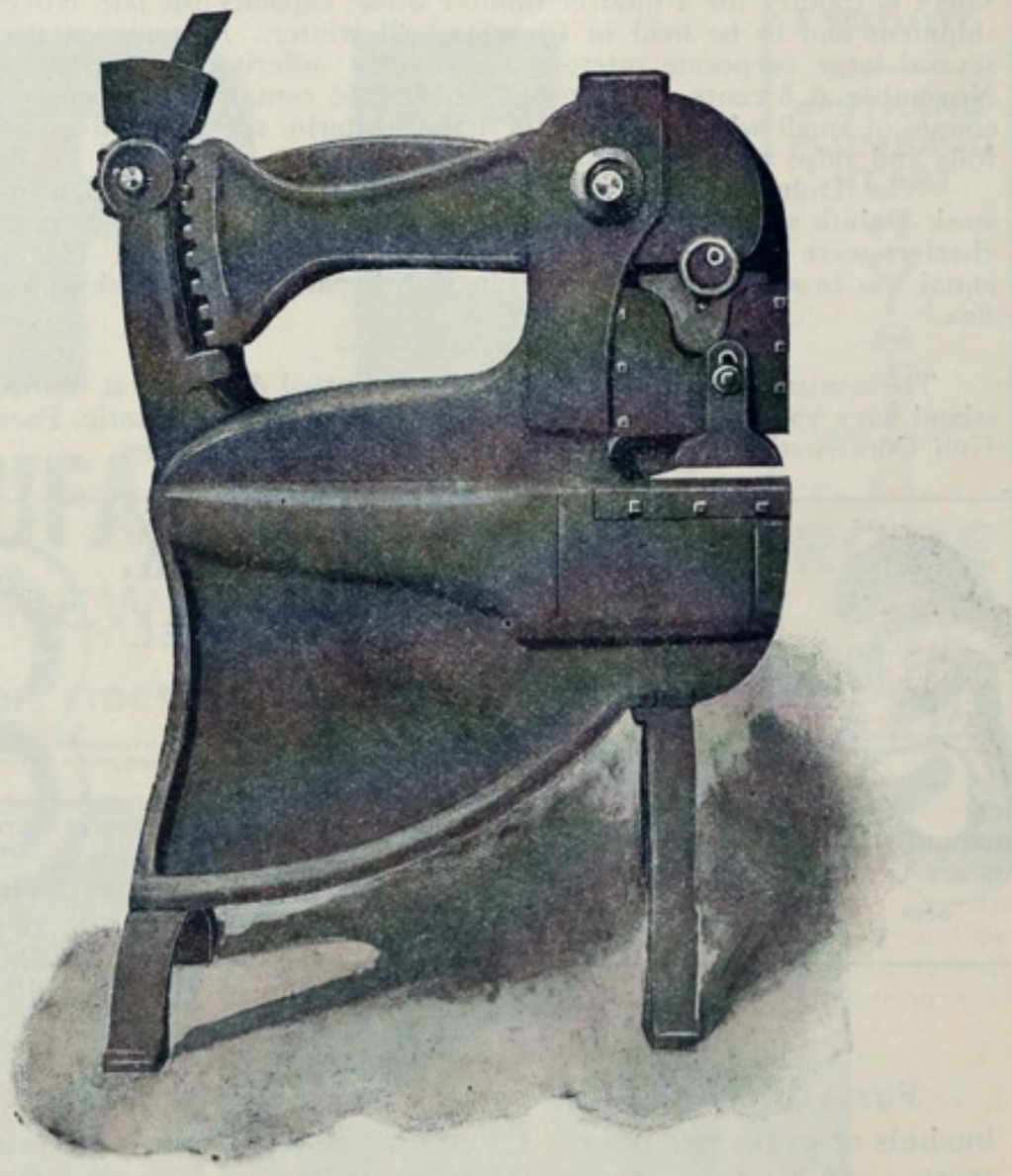
CAPT. WATKINS' PROTEST.

Capt. Frederick Watkins, commander of the American liner Paris when she went ashore on the Manacles, and who has arrived in this country to protest against the action of the New York board of United States inspectors of steam vessels in suspending him for two years, makes some rather caustic remarks anent the occurrence. The captain is quoted as saying in an interview:

"My principal reason in coming here is to fight the decision of the United States inspectors of steam vessels. By its confounded impudence the London board of trade put its nose in my affairs. It sent a communication to Ambassador Choate asking if there was going to be an investigation, and stating that if there was not the London board of trade would hold one. Ambassador Choate wrote to the secretary of the treasury, and he in turn communicated with the board of steamboat inspectors. Some of my friends wrote to the supervising inspector general, Dumont, of the United States steamboat inspection service, asking him not to be too severe. My friends seemed to think two months' suspension sufficient, but General Dumont replied 'Watkins is more than seventy years old.' What's the difference? Dumont himself is seventy-five years old, and he was never a sailor. The man knew I was not seventy for when you apply for a license it is necessary to file your age. Under my English license, what the board of trade should have done was to write to me asking if an investigation was to be held. The board of trade could have investigated the question of taking away my English license. Now I'm going to fight the matter right to the end. The accident, as I already have stated, was the result of a mistake on my part. In my report I told how the ship got out of her course, but the inspectors, in their findings, seem to have reckoned the matter not according to what I wrote, but according to the way they think it must have happened."

MACHINE FOR CUTTING SHEET METAL.

The machine illustrated herewith is made by the New Doty Mnfg. Co. of Janesville, Wis., and is designed especially for cutting sheet metal. It is a continuous shear. It is made in three sizes. The cut shows the largest size, the number 4 B. The smallest size cuts up to 3-16-inch sheets, the next size to 5-16, and the machine shown cuts up to ½-inch



sheets. They all cut sheets of any width or any length. These machines are strong and well made throughout. All the bolts are of steel and the machines are supplied with all necessary knives and levers and are shipped complete and ready for use. These machines are made especially for the use of boiler makers and sheet metal workers. The two larger sizes can also be supplied with a special attachment for beveling sheets.

French naval authorities have been conducting experiments with a torpedo boat of an entirely new model. It is small in dimensions and is intended to be swung like ordinary ships' boats to the sides of battleships.

STEEL RAILS AND IRON ORE.

The one item of special importance in iron and steel circles this week is the announcement that the steel works have just closed contracts for 1,500,000 tons of rails for delivery in 1900 at about $33 a ton. This big volume of tonnage, with the additional assurance that the railroads will be in the market for large numbers of cars and other requirements, gives assurance of the establishment of the present level of value throughout 1900. Before these orders were booked, there was some doubt as to a continuance of the present high range of values and full volume of business throughout the latter half of next year, but now that the business of the full year is secured, it would seem that there should be no delay in closing up at highly remunerative prices the sale of next year's ore. As the ore will be sold not only for 1900 but to cover also the requirements of the steel works and furnaces in the early part of 1901, there was some hesitancy about fixing prices on the basis of present conditions, but the developments of the past few days will very probably remove all doubt as to the advisability of such action and the ore business will be closed up within the next few weeks. Referring to the large orders for steel rails the Iron Trade Review says:

"Following the announcement that an advance from $33 to $35 would be made on standard sections, effective Oct. 21, large deals were closed at $33. It is estimated that upwards of 1,200,000 tons have been booked first and last for delivery in 1900, and there is authority for an estimate close to 1,500,000 tons, exclusive of rails carried over, that cannot be rolled this year. These sales and the advance to $35 at a time when comment was thickening to the effect that the danger line in all prices had been certainly past, have steadied the market on the present basis and given a strong guarantee of the preservation of substantially today's prices far into 1900. The belief that seemed to obtain in some quarters that all prices ought to be and would be lower for the first half has been revised to read 'ought to be, but will not.' The largest reported sale of rails is 110,000 tons to the Pennsylvania, the order being divided up as is usual with this road's tonnage. The week has brought also considerable purchases of Bessemer pig iron, the greater portion of the total of nearly 100,000 tons being taken by the leading billet producer of the central west. The price fixed by the associated valley furnaces on a lot of 60,000 tons was $23 at furnace, but some sales were made at higher prices, reaching $23.50 on one lot."

IMMENSE GRAIN STOCKS AT THE HEAD OF THE LAKES.

Duluth, Oct. 24.—One of the leading vessel agencies sends out this summary of freights:

"Wheat in store here exceeds nine million bushels—the largest quantity ever contained in Duluth elevators during October. This wheat is owned exclusively by the elevator companies, who are holding it for carrying charges. High ocean rates, inadequate car supplies east of Buffalo, and the independent attitude of the prosperous Dakota farmer, jointly retard the movement of wheat. If the demand for our wheat arises this fall, there will be lively times in this port during November. There is inquiry for a quarter million wheat capacity for late November shipment and to be held in Cleveland all winter. A representative of several large corporate interests has been offering vessels to load in November at 5 cents. It is probable that 7½ cents can be secured for a couple of small wheat cargoes for Lake Ontario, the vessel to pay canal tolls and ships to class second or better.

"The Duluth-Buffalo rate on wheat is still 4¾ cents. During the week Duluth shippers chartered only six vessels for wheat. Several flax charters were made at a quarter cent under the wheat rate. This differential was brought about by the superior dispatch accorded ships loading flax."

The contract for the construction of the naval dry dock at the League island navy yard near Philadelphia has been let to the Atlantic, Pacific & Gulf Construction Co. of New York City, the lowest bidder

AROUND THE GREAT LAKES.

During thirty days ending Oct. 15 vessels passing the city of Detroit numbered 3,156 and 20,536 pieces of mail were delivered to them and 10,311 collected. Oct. 12 was the big day. In twelve hours 103 vessels passed and 1,078 pieces of mail were put aboard or taken from them.

A dispatch from the copper region of Lake Superior announces that there is now full 20 feet of water in Portage lake waterway from Portage entry to the mouth of the ship-canal, while in Portage river there is 22 and 23 feet for almost the entire distance. Any vessel afloat on the lakes can now pass safely and expeditiously through these channels. The sharpest turns of Portage entry have been cut off and the channel widened as well as straightened.

About nine months ago, Capt. W. W. Brown quit the management of a dry dock plant in Cleveland (he had previously sailed lake vessels) to undertake a business of dealing in securities. This line of work seemed like a strange venture for a young man whose previous experience had been entirely with ships, but it is probable that there is not in Cleveland now a stock broker who has a business in actual securities equal to that already built up by Capt. Brown. He has been remarkably successful, mainly through having held to securities about which he was fully informed. He has negotiated a very large part of the transfers of stock of the American Ship Building Co. and Great Lakes Towing Co., and has also negotiated the sale of several vessels.

It is announced that with the close of the present calendar year the affairs of the Cuddy-Mullen Coal Co. of Cleveland, will be closed up, on account of separation of the interests of Messrs. Cuddy and Mullen. Mr. Cuddy is said to have agreed to sell to the Pittsburg Coal Co. ($64,000,000 combination) his interest in the Cuddy-Mullen company, but Mr. Mullen refuses to accept the price offered for his part of the property and says he intends with the close of the year to undertake a business independent of the combination. The Cuddy-Mullen company has a very large lake business and controls two car dumping machines, one on the Pennsylvania Co.'s lake front dock at Cleveland and another at Erie. It is announced, also, that another car dumping machine will be built at once on Pennsylvania lake front dock, Cleveland, to be operated by J. W. Ellsworth & Co. who are also as yet free of connection with the Pittsburg consolidation.

In a letter to Pickands, Mather & Co., Capt. Robt. McDowell of the steamer Kearsarge, says: "With the draught to which we are loading this season, it is all I can do to make the turn at the foot of Sugar island, Sault river, with the Kearsarge, when I have the whole of the channel. Just as we passed through the dyke bound down on a recent trip, I saw the Hesper coming up Little Mud lake and blew three whistles for him to check, so we would not meet at the turn, for it was impossible for us to go any slower than we were, as the current is so swift there. We met in the turn, and managed to pass each other, but it was the narrowest escape from a collision I ever saw. We just missed him. Can not something be done to have that corner dredged off? The gas buoy is down the river 100 feet or more farther than it was last season, and almost makes a turn of a square corner. It is only a matter of time when there will be a collision there if something is not done to remedy present conditions."

Mr. A. A. Jenkins of Cleveland, who spent a part of the past summer on one of the Lizard islands, north shore of Lake Superior, says that the party with whom he was hunting and fishing found large quantities of wreckage from the steamer Western Reserve, the Minch vessel that was lost with all hands, excepting one sailor, while bound up Lake Superior three or four years ago, and on which Capt. Peter Minch was lost with his wife and child. Among the wreckage was a board, probably from the side of the pilot house, containing the name of the vessel, and a hatch cover that was not at all broken. It is a strange coincidence that wreckage from the steamer Manistee, also lost with all hands (1882) was found in this same locality. But the Manistee was lost away up towards the head of Lake Superior. She left Bayfield for Ontonagon, but never reached the latter place, and the story of her loss is still untold. The Manistee was commanded by Capt. John McKay, brother of Geo. P. McKay. Twenty-seven lives were lost with this vessel.

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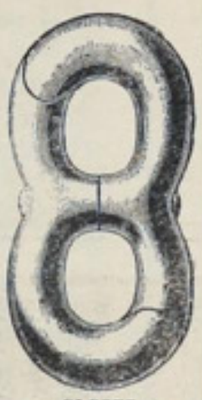
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TRADE NOTES.

J. J. Lynn of Port Huron, now represents in the trade of the great lakes the Shelby Steel Tube Co. of Cleveland, manufacturers of seamless cold-drawn steel boiler tubes.

One of the officers of Bertram Oil Polish Co. informs the Review that the polish manufactured by his company was used on the cup challenger Shamrock and that he has letters from both the Columbia and Shamrock people endorsing Bertram polish.

The Magnolia Metal Co. of New York, recently completed arrangements whereby the Q. & C. Co. of Chicago and New York become the exclusive agents for the railroad trade for Magnolia metal for the United States, Mexico and Canada, and the Metal Sales Co., 15 South Water street, Cleveland, have been appointed sole agents for Ohio, Indiana and Michigan. Mr. F. B. Squires is president of the Metal Sales Co. of Cleveland, and Mr. H. E. Cole secretary and treasurer.

Mr. Henry James Kimman, mechanical superintendent for the Standard Pneumatic Tool Co., Marquette building, Chicago, has sailed for England to superintend the installation of machinery in the works of the International Pneumatic Tool Co., Chippenham, Wilts, England, which company recently purchased the right to manufacture and sell the Standard company's "Little Giant" pneumatic tools and appliances in the British empire. After concluding his work in that country, he intends to make a tour of inspection and instruction among agencies of the Standard company in Paris, Brussels, Berlin, Dusseldorf, Vienna and Amsterdam. The main offices of the International company are in Palace Chambers, No. 9 Bridge street, Westminster, S. W., London. The company has just issued an elegantly printed catalogue illustrating and describing a line of "Little Giant" tools that comprises piston air drills, reversible piston air boring machines, and pneumatic hammers, blow-off cocks, flue cutters, reversible flue rolling machines, riveters, stay bolt cutters, chain hoists, jacks, etc.

It is said in newspaper dispatches from Bath, Me., that the torpedo boat Dahlgren, built by the Bath Iron Works, and which is having her official speed trial this week, attained a speed of 31 knots and has met with such favorable conditions in the trial that a great showing is expected in the official report. The Dahlgren was docked just previous to the trial in the small Simpson dock at East Boston. She made the passage from Bath to Boston in about the usual railroad time.

Representatives of the North German Lloyd steamship line have, during the past week, inspected a number of the largest dry docks on the Atlantic coast with a view to making plans for the docking in this country of the six largest vessels belonging to the company, none of which have heretofore been enabled to be docked on this side of the Atlantic. The docks at Newport News, at the Cramp yard, Philadelphia, and at the Skinner ship yard, Baltimore, were inspected.

VALUE OF STOCKS—LEADING IRON AND STEEL INDUSTRIALS.

Quotations furnished by HERBERT WRIGHT & Co., Cleveland, date of Oct. 25. 1899.

NAME OF STOCK.	OPEN	HIGH	LOW	CLOSE
American Steel & Wire.....	50½	50½	48⅝	49¾
American Steel & Wire, Pfd.....	94½	94½	94½	94½
Federal Steel	54¾	54⅞	53⅞	54⅝
Federal Steel, Pfd.....	78	78½	78	78
National Steel	48⅛	48¼	48	48
National Steel, Pfd.....	94½	94¾	94½	94¾
American Tin Plate	36½	36½	35½	35½
American Tin Plate, Pfd.....	83	.....	.....	83
American Steel Hoop.....	44	44	43¼	43½
American Steel Hoop, Pfd.....	82	82	80	82
Republic Iron & Steel	24	24¼	23⅝	24¼
Republic Iron & Steel, Pfd	70	70	69⅛	70

At a recent meeting of the naval board of construction, the secretary of the navy was urged to request that the Newport News Ship Building & Dry Dock Co. put the superimposed turrets of the battleship Kearsarge in working order as speedily as possible, without waiting to complete the vessel, in order that tests might be made so that the board could determine whether this style of turret is practicable. The board is divided on the question of putting superimposed turrets on the three battleships for which plans are soon to be drawn.

Keels for several new vessels will be laid shortly at the yard of the Newport News Ship Building & Dry Dock Co., Newport News, Va. The first to go down, that of the monitor Arkansas, will, it is expected, be laid in about two weeks, while the keel for the first of the two large steamers to be built for the Pacific Mail Steamship Co. will be put down three weeks or a month hence. The keel for the other Pacific mail liner and the United States battleship Missouri will follow in short order.

Bids have been opened for supplying to the Portsmouth navy yard an equipment of machine tools. The bidders included the Fitchburg Machine Works, Fitchburg, Mass.; U. Baird Machinery Co., Pittsburg, Pa.; Manhattan Supply Co., New York city; the Fairbanks Co., New York city; Manning, Maxwell & Moore, New York city; W. E. Drew, Manchester, N. H.; Fifield Tool Co., Lowell, Mass.; Israel H. Johnson, Jr., & Co. of Philadelphia, and the Niles Tool Works of Hamilton, O.

A conference will be held in Philadelphia within the next few days with a view to securing legislation looking to the deepening of the Delaware channel to 30 feet. Boston business men are also agitating vigorously the matter of securing better harbor facilities, in order that the large steamers now building for transatlantic service may visit that port.

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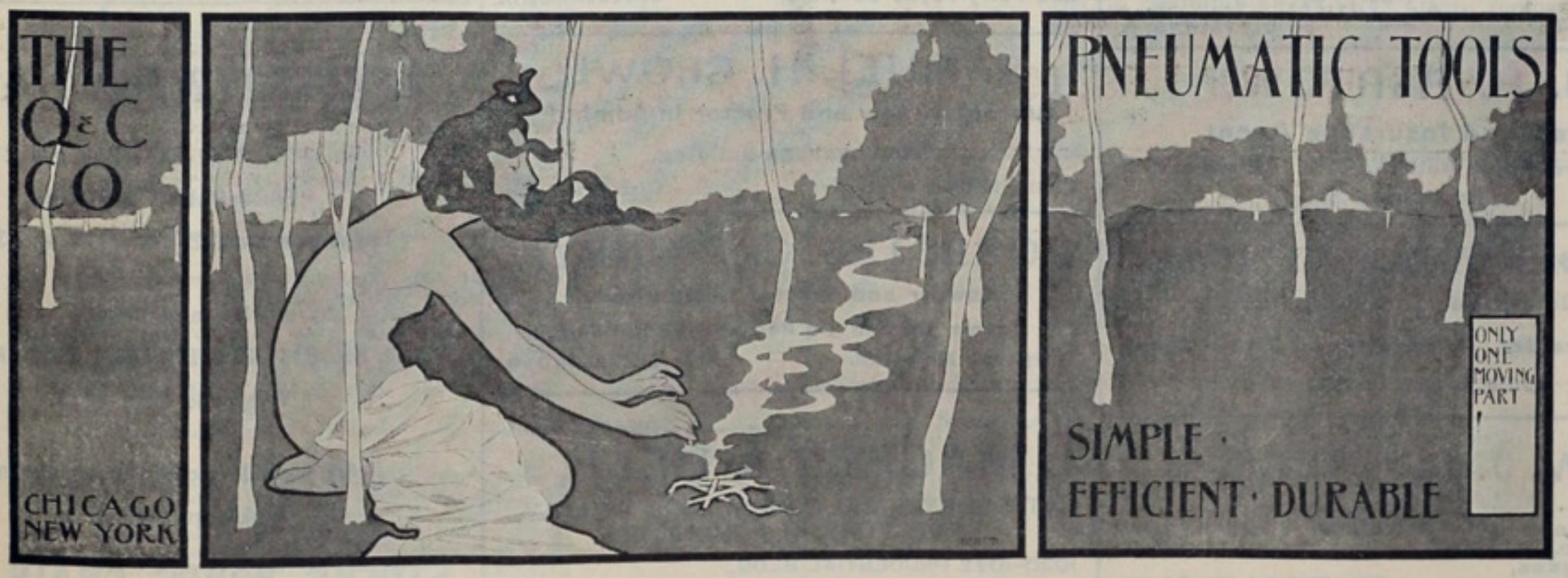

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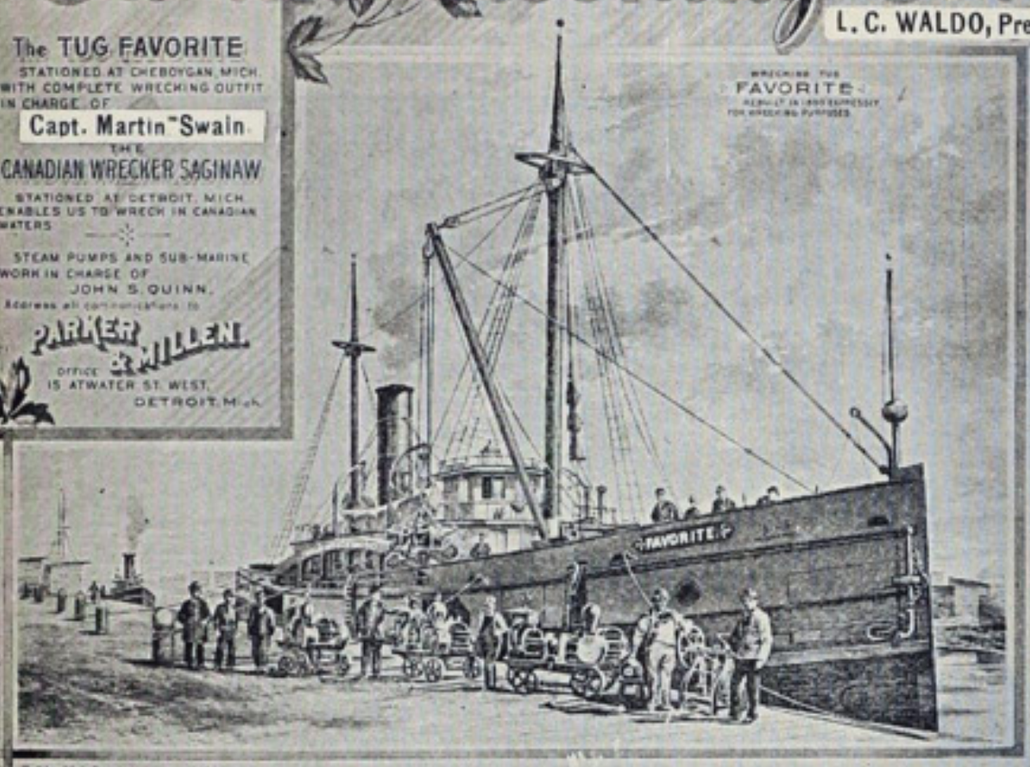

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8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..

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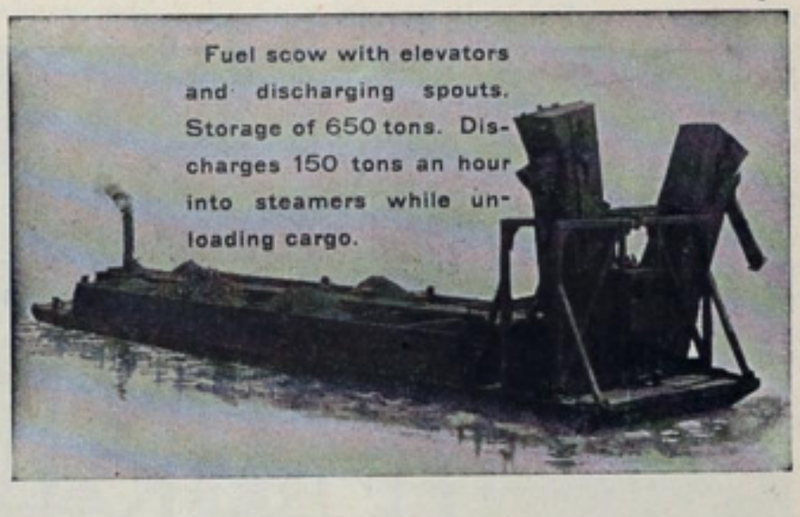

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Office of the Light-House Board, Washington, D. C., October 19, 1899. Sealed proposals will be received at this office until 2 o'clock p. m., on Monday, the 6th day of November, 1899, for furnishing the materials and labor necessary for the construction and delivery of a first-class steel steam light vessel, No. 73, for a fixed sum for said vessel delivered at the Buoy Depot at Woods Hole, Mass. Forms of proposals and plans and specifications, showing what is required, can be had or seen by applying to this office. F. J. Higginson, Rear Admiral, U. S. N., Chairman. Nov. 2.

U. S. Engineer Office, Montgomery, Ala., October 20th, 1899. Sealed proposals for building a sea-going hydraulic dredge will be received here until 12:00 M., November 22d, 1899, and then publicly opened. Information furnished on application. C. A. F. FLAGLER, Capt., Eng'rs. Nov. 16.

U. S. ENGINEER OFFICE, Montgomery, Ala., October 2nd, 1899. Sealed proposals for building two dipper dredges will be received here until 12:00 M., November 3rd, 1899, and then publicly opened. Information furnished on application to C. A. F. FLAGLER, Capt., Engineers. Oct. 26

U. S. Engineer Office, Galveston, Tex., Oct. 16, 1899. Sealed bids, in triplicate, for deepening channel from Galveston Harbor to Texas City, Tex., will be received here until 2 p. m. Nov. 15, 1899, and then publicly opened. For information apply to C. S. Riche, Capt., Engrs. Nov9

U. S. Engineer Office, Montgomery, Ala., October 11, 1899. Sealed proposals for dredging on Carrabelle Bar, Fla., will be received here until 12 m., November 14, 1899, and then publicly opened. Information furnished on application. C. A. F. Flagler, Capt., Engrs. Nov9

U. S. Engineer Office, Montgomery, Ala., October 11, 1899. Sealed proposals for dredging in Apalachicola Bay, Fla., will be received here until 12 m., November 14, 1899, and then publicly opened. Information furnished on application. C. A. F. Flagler, Capt., Engrs. Nov9

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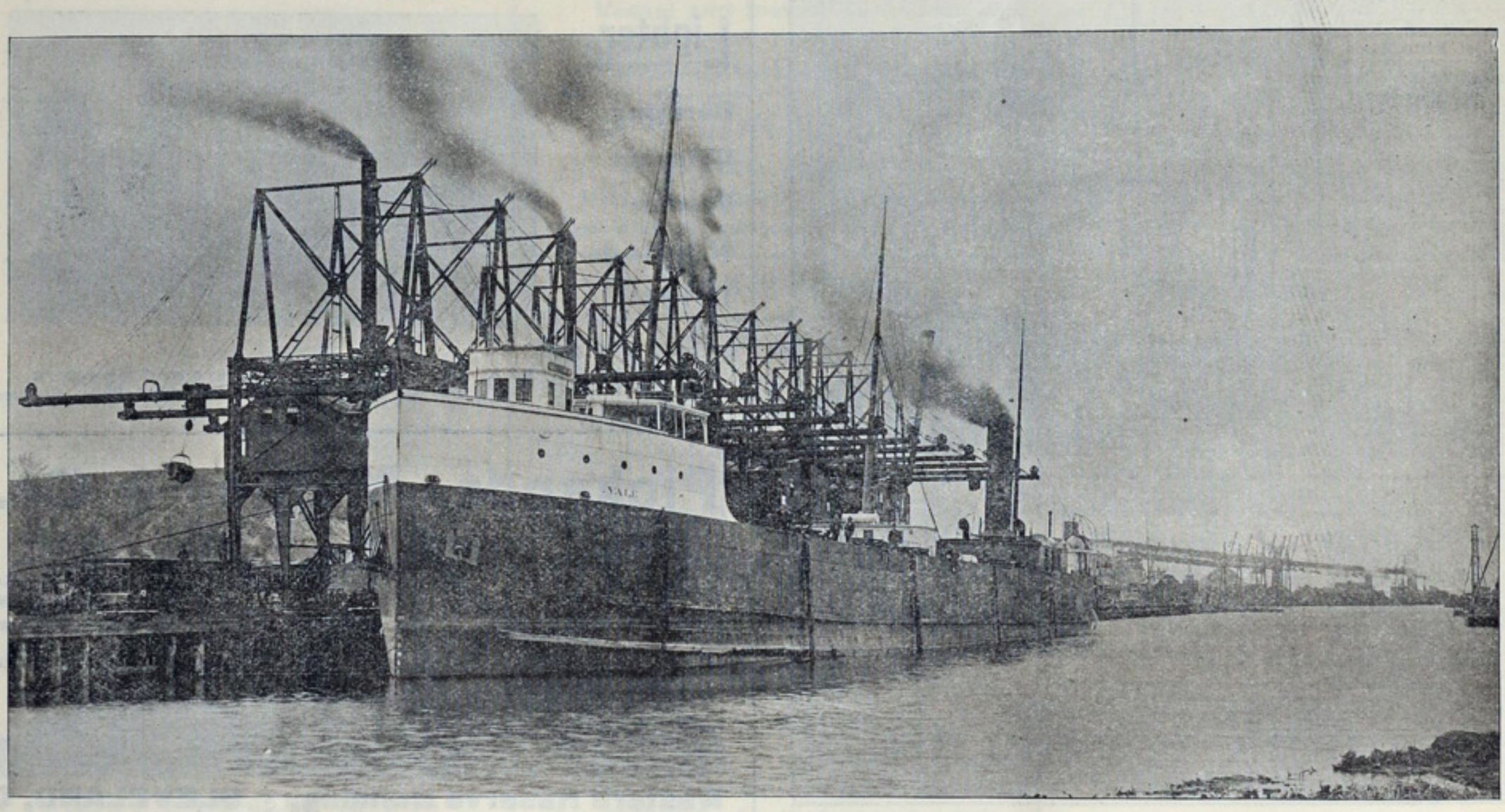

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